



# ***NEWSLETTER***

EUROPEAN WOMEN IN MATHEMATICS

ISSUE NO.29 • 2017/2



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**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>

Committee for Women in Mathematics:  
<http://www.mathunion.org/cwm>

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/](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>



EUROPEAN WOMEN IN  
MATHEMATICS

# GENERAL MEETING 2018



GRAZ, AUSTRIA  
SEPTEMBER 3-7, 2018

**REGISTRATION**

<https://sites.google.com/site/ewmgm18/>



# FOREWORD

Dear Reader,

First of all, I would like to welcome **Francesca Arici** and **Olga Kuznetsova** to the editorial team and to thank **Jasmin Raissy**, who decided to step down, for all the work she has done.

The EWM Newsletter is in general dedicated to the present: we interview mathematicians and highlight current or future events. In this edition, memory plays an important part.

2018 will be the 30th birthday of EWM and I thought it would be important to remember the beginnings of the association, in particular for people, as myself, who were not there.

**Laura Tedeschini Lalli** told me fascinating stories, full of energy, optimism and will to change things, so I asked her to share some of them here and **Marjatta Näätänen** contributed her tale of the set-up of EWM as a Finnish association.

Moreover, 2017 has been the 30th birthday of *femmes et mathématiques*, the slightly older 'sister' of EWM and **Colette Guillopé** reported for us about the celebrations.

And, sadly, this year Maryam Mirzakhani, a great mathematician and the first woman awarded a Fields medal, passed away. The President of the Association for Women in Mathematics (USA), **Ami Radunskaya** and her colleague **Lily Khadjavi** commemorate Maryam's life and achievements in a beautiful article.

Back to the present, we report on meetings and ongoing projects and we interview **Sara van de Geer**, from ETH Zürich, together with **Maryna Viazoska**, EPFL Lausanne and **Sara Zahedi** from KTH Stockholm. And, as a suggestion for a thrilling read during the winter break, **Mihaela Pricop-Jeckstadt** reviews *A Life in Code* by G. Stuart Smith, the fascinating tale of life and adventures of Elizebeth Friedman, pioneer of cryptography.

Finally, we thought it is time to give the Newsletter new clothes: we hope you like the new look.

With best wishes for the new year,

Anna Maria Cherubini

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# COMBINING PHILOSOPHY AND MATHEMATICS

AN INTERVIEW WITH SARA VAN DE GEER  
BY MIHAELA PRICOP-JECKSTADT



Photo courtesy of Sara van de Geer

*Sara van de Geer has been Full Professor at ETH Zurich since September 2005. Her main field of research is mathematical statistics, with special interest in high-dimensional problems.*

*The focus points are: empirical processes, curve estimation, machine learning, model selection, and non- and semiparametric statistics.*

*She is a member of very prestigious organizations like the Research Council of The Swiss National Science Foundation, Leopoldina German National Academy of Sciences or the International Statistical Institute, and fellow of the Institute of Mathematical Statistics. She is a correspondent of the Royal Dutch Academy of Sciences and the President of the Bernoulli Society.*

**“If the statistics are boring, then you’ve got the wrong numbers”, said Edward R. Tufte about your research area.**

**How did you discover the passion for mathematics, and what fascinates you in the random processes?**

Indeed, when I started with statistics as a topic for my master thesis, it was not all that popular. How times have changed! Statistics is no longer considered as being boring. On the contrary, it is a very exciting research theme nowadays. Statistics has a substantial role in for example 'machine learning', 'data science', or 'information theory'. I discovered statistics as a way to think about 'knowledge'. To me, it is a mix of philosophy and mathematics.

**Your father was a famous psychologist who studied the psychology of problem-solving. How did he influence your decision to become a mathematician? Could you suggest some approaches that are helpful in the process of formulating and resolving abstract tasks?**

There is a Dutch children's song which I translate

*Three times three is nine  
Everybody sings his own song  
Three times three is nine  
Alice sings her song*

And when Alice is finished the above song starts again to have the next person sing his song. When I was about four years of age my father asked: 'How much is three times three?' I immediately answered: 'Nine of course!' This greatly impressed my father. And I could not imagine he didn't know the song. So my father believed I had mathematical talent and that is how it all started. My father greatly encouraged me to follow the mathematical path.

You ask me about approaches for formulating and resolving abstract tasks. I don't know really, the best thing to do is perhaps to take a walk and think about it. And then do something else and try not to think about it all the time. The statistical approach to answering some question is to

some extent the empirical method and based on the idea of following a pre-specified protocol. But admittedly, this is not possible for human beings and maybe that is our strength. When evaluating data and drawing conclusions from them, one should probably follow the scientific method as good as one can, taking reproducibility and replicability into account. But it is human's nature if in the process one changes one's mind (after looking at the data). This may lead to so-called false positives (research results that do not show up in new studies) but on the other hand, it does help science to progress.

**Your contribution to the area of empirical processes allowed a break-through in the theory and the applications of penalization methods. The understanding of high-dimensional data originating in genomics or medical imaging could not be conceived without it.**

**What do you think is the biggest progress made in statistics in the last half century and which are the fundamental problems that you consider of large interest in the today's statistical research?**

Believing in sparseness is like saying: it looks all pretty complicated but behind it, all are some simple mechanisms.

Thank you! Statistics is undergoing great progress, inspired by the new data structures. I find the concept of sparseness when dealing with high-dimensional data very appealing. Believing in sparseness is like saying: it looks all pretty complicated but behind it, all are some simple mechanisms.



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So, there is nothing new, but the current modeling based on some underlying sparseness idea is quite successful. To me, it provides a handle to understand today's complex algorithms and also to understand their limitations.

A fundamental problem that is also not new but appears in a new dress is that procedures are being developed that, on the one hand, are shown to be theoretically optimal (in some sense), but, on the other hand, one can also prove that it is impossible to know their accuracy.

Thus, we have to reformulate our aims when estimating the accuracy of complicated adaptive procedures. In this light, there are current new approaches using conditional inference. This is all very intriguing to me.

With the new data, say shapes or graphs or networks, the computational aspect is also a big issue: what is the value of a statistical optimal procedure if it is NP-hard to compute? Conversely, why strive for small computational error below the statistical error? In other words, statistics and optimization theory go hand in hand these days, generating lots of new mathematical theory and insights.

**Teaching mathematics, especially to non-mathematicians, can be a challenge. What is your strategy to catch and keep the attention of your audience?**

The way I myself learn something is often chaotic. I find it difficult to take the linear way. Nevertheless, to go through the new material in class, a certain straight line is almost indispensable.

Yet, for mathematical statistics, one needs many other branches of mathematics: measure theory, analysis, optimization, probability theory and sometimes even

differential geometry. So a bit of hand-waving is unavoidable and there goes the linear path! I tell the students that statistics is not a closed set and that's what makes it a nice challenge.

Many students like that, but of course it is a bit of a problem when it comes to preparing for the exam. Therefore I also try as much as possible to offer them a closed set of things to know for the exam.

**You became a famous mathematician at a time when concepts like work-life balance were still unknown. Could you tell our readers what is the secret of your personal and professional success?**

I have faced some difficulties being a woman in the world of mathematics. When my son was born I got a reprimand because my publication list was considered as too slim. It bothered me quite a bit, but I told myself that I had been very productive in another sense!

There is no secret of course. There were many hurdles to take and all I did was just continuing the work.

There is no secret of course. There were many hurdles to take and all I did was just continuing the work. I did not have any special ambition, it was just a job, and a nice one too. For example, I did not really want to do a Ph.D. I quit a research project because I was not really convinced of the models used. People do not seem to understand such moves. During the years, I did develop a certain ambition,

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that's true. Now, I am almost swallowed by the work. But I take my time for doing things in the house. Following the example of my grandmother, I always wear a little apron when I am at home.

**What is your opinion about the special mentoring programs in mathematics? What should it be the role of a Ph.D. advisor or of the mentor for a postdoc student?**

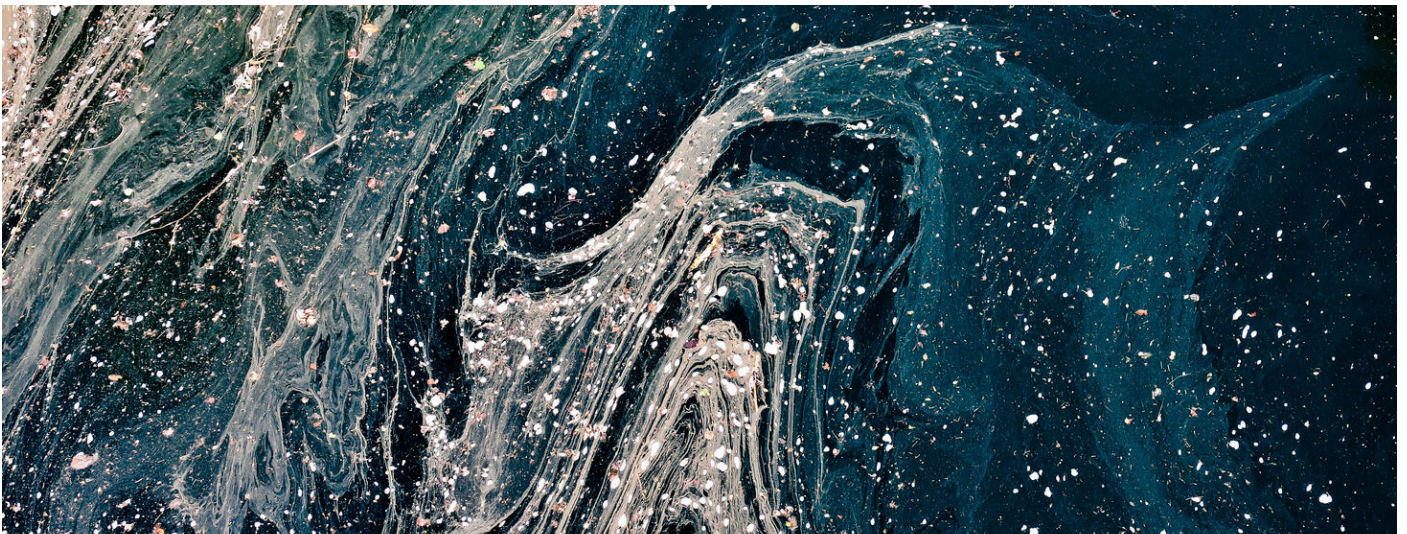
As a mentor, I so far only have discussed their study programs with the students. And so far they have shown to be very independent and motivated for their choices. There was not much for me to do.

What in general the role of Ph.D. or Postdoc advisor should depend on the situation, I would say. As for Ph.D. students, I am the more experienced one, so my role is in part to help them find feasible research directions, to help avoid dead ends. I tell them about conferences and workshops that they might want to attend, things like that. For the rest, we

are scientific collaborators. Mentoring a Postdoc means to me help him or her set up an own research line. It implies among other things that I am most often not a co-author of their papers. Once Postdocs and Ph.D.s start writing papers with each other I see my mission as being successful.

**Do you consider necessary to organize special programs like Girl's Day promoting science for girls in schools? What do you think it can still be done to support woman careers in mathematics?**

There I too have many questions. Do we have such programs to improve science or to improve women's lives? Are the goals that men set themselves comparable as those of women? Why are more women in statistics than in, say, pure mathematics? (I do not have the exact statistics.) I have experienced much support during my career. For example, I felt people appreciated me as being one of the few female students. Then as time went by it sometimes looked grimmer. And then at ETH, I found again a very welcoming research environment. In my view, the best support is allowing people to have a life besides the job.



# DARING TO REIMAGINE

AN INTERVIEW WITH MARYNA VIAZOVSKA  
BY ANNA MARIA CHERUBINI AND FRANCESCA ARICI



Photo courtesy of MFO

***Maryna Viazovska** earned a doctorate in Bonn in 2013 and has been post-doctoral researcher at the Berlin Mathematical School and the Humboldt University of Berlin.*

*She has been Minerva Distinguished Visitor in Princeton and currently holds a tenure track assistant professorship at the École Polytechnique Fédérale de Lausanne.*

*Maryna received the Clay Research Award and the SASTRA Ramanujan Prize for her work on sphere packing and modular forms, and the 2018 New Horizons Prize in Mathematics.*

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

How I explain my research depends on the person I am talking to. Someone who is not a specialist in mathematics is



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probably a specialist in something else and it's always easier to explain something when you know what the person is interested in.

My experience is that people remember very little from the mathematics they learned at school and talking about mathematics it's usually not a very good way to connect with people. This is on the other hand different when it comes to scientists working in some other sciences: many of my friends work for example as programmers. People that work in IT don't do academic mathematics, but they do know quite a lot, so it's easy to explain to them.

### **Let's explain your research to the readers of the EWM newsletter:**

I think of myself as a number theorist, meaning that the problems I work on are usually problems in number theory. More specifically, my area of specialization is automorphic forms.



What I try to do is not developing the theory of automorphic forms itself but rather searching for interesting applications. These include the theory of elliptic curves, and through elliptic curves, there is a connection to diophantine equations and to rationality results.

Another direction in which I work is the connections between automorphic forms and Fourier analysis.

### **You recently received the Clay Research Award: can you tell us something about the sphere-packing problems and about your results?**

The name "sphere-packing" kind of speaks for itself: this is the problem of packing equally sized  $d$ -dimensional balls into the  $d$ -dimensional Euclidean space and it is one of the classical geometric problems. It turns out that in dimensions 8 and 24 this problem has a particularly nice solution and this solution is not geometric or combinatorial but it comes from harmonic analysis on the Euclidean space. This is the reason why I became interested in this problem and then I found this solution.

### **Can you tell us something about your story? When have you decided to be a mathematician and why?**

My path was quite smooth. In Kiev, I attended a school where there was a special curriculum in the natural sciences and I was involved in mathematics olympiads and similar activities. When the time came to decide at which university I wanted to study it was quite natural to me to study mathematics.

I got a Bachelor degree in Kiev and by the end of my bachelor I realized that I was not so much interested in the mathematical competitions anymore, but I realized that



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mathematical research was also very interesting.

For my master degree I moved to Germany, Kaiserslautern, and then I obtained my Ph.D. in Bonn.

One more thing, related to why I decided to become a mathematician. I remember that when I was a high school student I read a science fiction book, where the main character was a mathematician who had found new ways of solving differential equations.

The most intriguing part was the beginning: a mathematician is giving a lecture at the university, some students come, some colleagues show up and everything is as usual. After the lecture, a strange person comes to talk to him. It turns out this person is a robot sent to Earth by some superior civilization, with the job of taking care of whatever happens there.

Unfortunately, he is not doing its job very well. He is a kind robot who is trying to do its best, but he cannot predict the consequence of his decisions. He can control many things but he cannot predict the long-term consequences. The mathematician, on the other hand, has discovered a way to predict the behavior of solutions of chaotic differential equations.

This was the most interesting part of the book and what I still remember about it. It made me think that being a mathematician was not a bad idea: imagine if you could compute and predict the consequences of our actions, it would be great. Of course from a mathematical point of view, it is way too naïve, and you don't expect to have mathematical tools like this, but still, the whole story was very fascinating.

**Do you have a dream? Any particular problem you dream to solve now?**

My mathematical dream would be to solve a problem that nobody has thought of. You know how they say: good mathematicians can hit the goal that everybody sees, it's the genius can hit the goal that nobody can see.

This is exactly what I find most inspiring in the history of mathematics: not when somebody solves a long-standing conjecture, but when somebody discovers a completely new direction or completely new phenomena that nobody had ever thought about before.

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Think of when Grothendieck re-discovered algebraic geometry and put it in a completely new setting, or think of the discovery of fractals: in the mathematics that existed before there was simply no space for objects like these. Discoveries like these really change mathematics and the way we think about mathematics itself.

**Do you have any other passions apart from mathematics?**

I have an 8-year-old son and he is a big part of my life. So I

spend my time between mathematics and my family.

**You will be one of the plenary speakers at the General Meeting of EWM next year: which is your point of view on issues about women in sciences and in particular in maths?**

Women are still somehow a minority in mathematics, and it doesn't feel like the numbers are right. One reason for this I think is the prejudices that people have.

The general mindset for parents is that boys are supposed to be good at science and girls are supposed to be good at something else. I find this attitude very harmful: when young adults choose a career for their future they don't really choose among all possibilities they have and don't find what they can do best.

It's funny, I hear young parents like me saying things like "chess is very good for boys". Why? Chess is good for both boys and girls as long as they like it. If your child is a boy it doesn't imply he will be good at chess, and the opposite is also not true.

Another thing that certainly also plays a role is that the rules of the game for young scientists are not very family-friendly. Many women that decide to leave the academic career do it when they have a family and realize they cannot be very mobile. The postdoctoral phase often requires people to move between countries. For someone who has a family, especially children, this is very difficult. I often think that a family-friendly policy would benefit not only women but also men who are in academia and young people who want to pursue a scientific career.

I read several studies about how Ph.D. students and postdocs suffer from depression. How can you not suffer from depression if you have to move every two years and all your personal relations are harmed by this? It is maybe at this point that women decide to compromise their career and choose to stay with their family.

But it is a complex problem and it's not so clear how it would be possible to solve it in a fair way.

I often think that a family-friendly policy would benefit not only women but also men who are in academia and young people who want to pursue a scientific career.

# TAMING FLUIDS

AN INTERVIEW WITH SARA ZAHEDI  
BY ANNA MARIA CHERUBINI



Photo courtesy of ICIAM

*Sara Zahedi is Assistant Professor in Numerical Analysis at KTH Royal Institute of Technology in Stockholm. She earned a doctorate at KTH in 2011 and has been a post-doctoral fellow in Uppsala. She was one of the ten winners of the European Mathematical Society Prize for 2016 for research regarding the development and analysis of numerical algorithms for partial differential equations on moving domains.*

**How would you explain your research to a non-specialist? Which are your favorite results up to now?**

My research concerns the development of accurate and efficient computational techniques for computer simulations

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of immiscible fluids. In such simulations, the main challenge is that partial differential equations need to be solved in/on domains that are evolving with time and may undergo strong deformations. These partial differential equations may also have discontinuous parameters and solutions. We have, for example, developed and analyzed a computational method for accurately computing the fluid velocity which may have a discontinuous gradient and the pressure field which may be discontinuous across the interface separating two immiscible fluids without the need of conforming the mesh to the moving domains.

### **Can you tell us about the applications of your research?**

Accurate computer simulations can improve our understanding and for example help in the design of microfluidic devices in which fluids are manipulated and controlled in miniature channels. An example of such a device is Lab-on-a-chip, a credit card sized device, which can perform lab processes, for example, detect viruses or bacteria instantaneously.

### **You studied in Sweden, where your family moved from Iran: can you tell us something about your story? When did you decide to be a mathematician and why?**

I came to Sweden as a child without my parents, I didn't know anyone and I didn't know any Swedish. In the beginning, most of the classes in school were difficult for me to follow but I could follow the math classes. It was also easier for me to communicate with other students in the math classes so math became my favorite subject early. My interest and my teacher's encouragement made me choose to become a mathematician.

### **Has anyone supported you in your choice and during your career? You remember any obstacles?**

My husband and my mother have supported me a lot. My high school teacher in math and physics, Maj Bodin inspired me, she told me at that time that I would either become a mathematician or physicist. When I started at the University several of my teachers encouraged me in my studies, in particular, Prof. Boris Shapiro. My Ph.D. advisor Prof. Gunilla Kreiss introduced me to the world of computational methods for multiphase flow problems. In the last five years, Prof. Mats Larson has been as a mentor for me.

The long time of uncertainty of getting a permanent position in academia, the requirement to do postdocs often several at different places, with advantage abroad, creates obstacles which become quite challenging when you have a family and children.

### **Do you have any other passions apart from mathematics?**

My children are my passions. I spend most of my time with them.

### **You were the only woman awarded a prize at the European Congress of Mathematics in 2016 (out of 12): which is your point of view on issues about women in maths?**

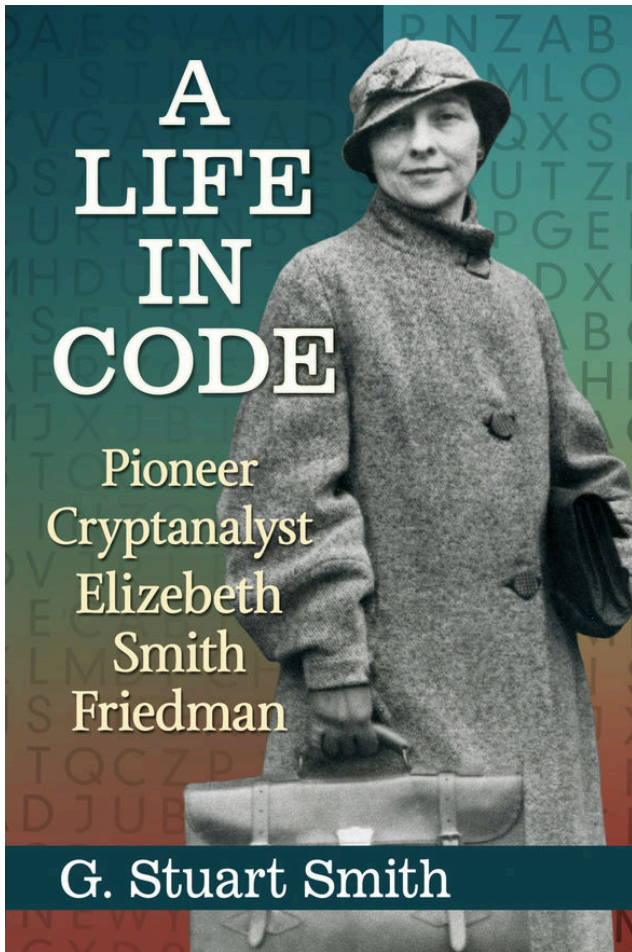
There are many excellent women in math but it is also the matter of seeing them, supporting them early in their career and giving them the opportunities they deserve.

### **Do you have a dream?**

I dream about a future where at least 6 of 12 prizes are awarded to women. :)

I also dream that I one day can see a democratic Iran ruled by the people for the people. That is what the people of Iran deserve.





Cover: McFarland

# "A Life in Code"

by S. Smith

REVIEW BY MIHAELA PRICOP-JECKSTADT

Mathematics was seen as a male playground for centuries, hence it is a great pleasure to write a review about a book that focuses on the beginning of cryptography as a new science, and the remarkable work done by Elizebeth Friedman in this area. Even if in the twentieth centuries scientific careers were open to women as well to men in the USA, prejudices against 'working mums' and conservative laws stayed in the way of women making careers and having families. Elizebeth Friedman had the brains, the will and the determination to overcome these and to establish herself to be "a pioneer in code-breaking" as her biography on the NSA

Cryptologic Hall of Honor says. Since 2014, the Elizebeth Smith Friedman Intelligence Award of Excellence established by the Women in Federal Law Enforcement Association recognizes her pioneer work to enforce the federal law through cryptography. Her life story looks like a James Bond novel, and it is a mixture of (family) love, fight against crime and spy stories.

But let's start with the beginning. Our heroine was born on August 26, 1892, in a Quaker family from Huntington County, Indiana, and had a degree in English literature from

## BOOK REVIEW

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Hillsdale. Fate made her encounter Colonel Fabyan, a millionaire hoping to become “known to posterity”. He established a kind of Renaissance villa on his property in Riverbank, a scientific, agricultural and recreational complex, and hired Elizebeth to help with one of his major projects: proving that Shakespeare was nom de plume of Frances Bacon and that his plays were hiding ciphered secrets. A team led by Elizabeth Wells Gallup worked towards deciphering them and co-opted Elizebeth towards this aim. During her stay at this villa, she also met her future husband, William Friedman, a graduate in genetics, and directed him towards cryptography.

The beginning of the First World War and the invention of the radio had a large impact on Friedmans' lives, transforming them from literary to military code-breakers. The premises of Riverbank became a training center for military cryptanalysts, with William in charge and Elizebeth second-in-command. Thousands of messages between Germany and their agents on the American continent were decrypted here. One of the cases that made the press was a Hindu group in the United States, allegedly working to undermine the British control of India. As a result of their common work on military cryptography, the Friedmans wrote a brochure, “The Solution of Running Key Ciphers”, the first of a series of co-brochures on this subject. “The Index of Coincidence and Its applications in Cryptography” authored only by William Friedman and considered “the most important single publication in cryptology”, was also written during their Riverbank era.

The end of the war did not mean the end of Elizebeth's cryptographic career due to the social experiment of Prohibition. After moving to Washington, she was hired by the Coast Guard Intelligence Section in 1924 to help law enforcement code breakers fight against smugglers called “rum wars”. She was credited with solving more than 12,000

messages and became renowned by giving testimony in some famous court cases. Reader's Digest presented her in the 1930s as the “Key Woman of the T-Men”. Her work also put her life (and that of her family) in danger and in some of these cases bodyguards were employed to protect her. Even if the wisdom of trying to enforce prohibition is debatable, Elizebeth's contribution to turning the tables in this battle is officially recognized e.g. in the Center for Cryptologic History.

The Second World War brought bigger challenges to the couple. Even if women were not allowed in the Army, she became second-in-command of a Navy unit assigned to breaking messages on the German Enigma cipher machine and played a key role in bringing a Japanese spy, the Doll Woman, to justice.

After the war, she was still very active and returned to be a literary code-breaker. She dedicated herself to the debate about Shakespeare works that was raging for decades between Stratfordians and Baconians. She came to the conclusion that Shakespeare was a person on his own and that his works were not ciphered. The jointly-written manuscript (with William), “The Cryptologist Looks at Shakespeare”, won the Folger Shakespeare Award, and the published book, “The Shakespeare Ciphers Examined”, won the Fifth Annual Shakespeare Award from the American Shakespeare Festival Theater and Academy.

“A Life in Code” presents the life and work of a wonderful woman: mother of two, beloved wife, a pioneer in cryptography. A lot of her work is still classified or was destroyed for security reasons. But the author succeeded to draw a fascinating picture of her professional activity over more than 40 years of code-breaking. If you want to find out more, I recommend to read the book: it requires some concentration but gives you a thrill of a mystery story.

# EWM TURNS 30

## For EWM's 30th Birthday

BY LAURA TEDESCHINI LALLI

We might be legitimately counting EWM's birthdays in different ways. As it is customary to celebrate more solemnly birthdays in number with divisors 2 and 5, it would become crucial to decide when were we born. Ours was a collective history and our sure beginnings, with somewhat meandering formalizations, really testify to its success. Over the year we have needed to make decisions, as what we meant of each of the words involved in our name, for instance. We were formally active and established before EMS was, and this probably due to our decision to set the least possible number of borders and exclusions. We knew, as women in mathematical research, we needed to overcome unwanted isolation: mathematics needs to be communicated, especially in its research stage.

So let me remind that very nice and detailed reports about the history of EWM, by Caroline Series and Bodil Branner have been presented and are available on the association's webpage. In particular, they report carefully the various milestones that could be honestly labeled "birthday": the first meeting in Berkeley the first meeting in Copenhagen, the formal establishment of a European

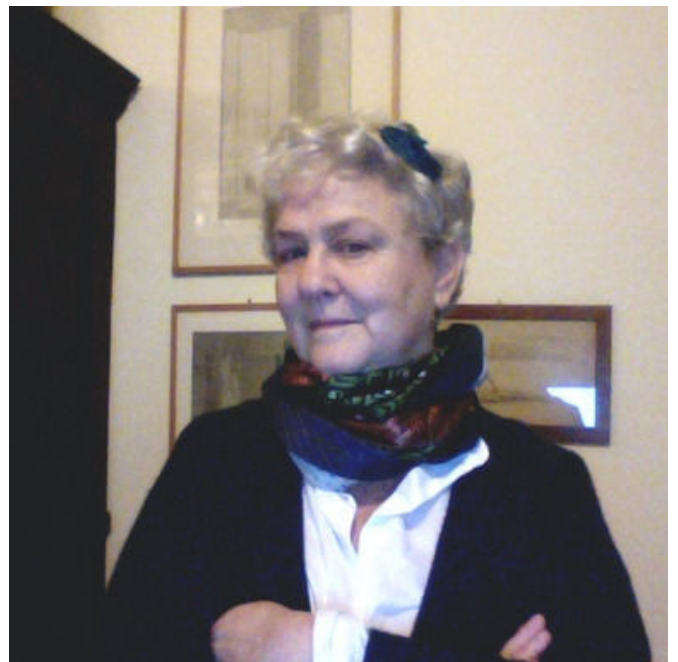


Photo courtesy of L. Tedeschini Lalli

Women in Mathematics Association. I refer to their beautiful account, retrievable on our association's webpage, and I asked Marjatta Näätänen to tell us about how and when did it happen that finally, the formal association decided to

have siege in Finland. Marjatta was also responsible for the first video shot about EWM. The video is still available and still arises attention and interest, as was clear at the “Public Day” in the international Conference Bridges in Finland, 2016.

So I will add my personal recollections and why it was important to me.

I arrived at EWM at the Warwick meeting 1988. Let me tell you where I came from. I come from a country, Italy, where you can meet women mathematicians: this was not the problem. I was used to be in good company, supported, and not over protected, and this I think is still important to us. I came from an experience where it would be natural for a well established (female) full Professor to tell me “Ciao, darling. Let me look at you, you look fine, this is great. We have a lot of work to be done here. Can you count on somebody to take you newborn here? Then you could nurse in my office, as yours has 4 other people so it is not too private, and mine has an armchair, so it is more comfortable to nurse”. I realized that this kind of matter-of-fact solidarity was not common and not expected in other cultural contexts. I think this is important. Later on, in a department meeting, somebody was complaining about the Italian maternal leave laws and rules, which would leave the department’s teaching load somewhat in need in the following months. I cannot forget the Chair’s comment. She was another well-established female full professor, and she said “First of all, this is a good news, so let us extend our congratulations to the mother and to the newborn. And now, we will get organized and we will deal with it”. Nobody dared complain anymore.

In a very recent paper published by the Italian version of Scientific American, Susanna Terracini stressed, again matter-of-factly, this need for support and need not over-protect, in order for the individual to accept challenges and responsibilities, and to blossom. We all need it; support, and an attentive ear, which in mathematics research is really precious for the much-needed feedback.

But all this was away from any form of associative life and public standing about women. That was almost taboo in Italy then, as if having an official association could be challenging the neutrality of mathematics as a science. This is what has been new to me in the new cultural environment: they had the habit to have and establish all kinds of associations and professional associations. It has not been easy, for all of the women that came from different cultures and countries. We have had to learn to establish associations, to establish rules and especially form a consensus. In my recollection, all the process of integrating different habits has been supported tremendously by the example of Femmes et Mathématique. They existed, they were recognized, they could address all sort of different problems: professional, scientific, political. They were reliable and well respected. And they were immersed in a country more similar to mine for some aspects in respect to women, in particular as regards women intellectually successful women. A theorem of existence proved by example is always quite impressive. We decided the real backbone of EWM would then be the general meeting. To this end, we decided not to have a “president”, but a “convenor”, i.e. somebody who would take the responsibility to make sure the next meeting would in fact happen. Then we were faced with rather different ways to intend the organization of meetings. It was then I realized Europe is really “diverse”!

What EWM gave me most is in fact really on the scientific side. We were all eager to see if meeting together we could come up with different or more communicative ways to organize things, and I still treasure and use them. For the first meeting I attended, in Warwick, Caroline Series was able to gather some funds on the grounds that we were doing “cross-fertilization”, a very positive outlook on the fact that the association was not specialized in any branch. And I think still this is one of the great assets of EWM. To



overcome isolation you need to look beyond your strict field. Our general meetings have always seen a prominent scientific part, organized so that everybody can learn something. We came up with the idea that there had to be somebody, in each conference, that would take the responsibility to ensure the communication would smoothly go on. This meant, then, to put somebody in charge to ask questions, so everybody could follow, and somebody to organize a place and time to discuss, should questions and answer become too invasive of the talk.

Also, the printed outputs have been something to remember. The Luminy 1991 proceedings, for instance, contain an Introduction to Symplectic Geometry: 25 precious pages written by Michèle Audin, Dusa Mc Duff, and Yvette Kosmann-Schwarzbach. Perfect, rigorous, up to date, and still introductory.

We have also experimented with poster sessions, which normally are the “uneasy” part of scientific meetings, but a part that can allow more needed visibility to more members, and a good purpose for asking travel funds. We came to some possible corrections of the uneasy trend: we would gather together to actually write and assemble the posters in the first evening, we would ask to also insert something about the author, and, importantly, also established mathematicians would write posters. Just to keep on communicating.

I see that now the possibility of minisymposia has been added, and this is fully in the line of the original attempt at communicating.

And, last but not least, I always resorted to EWM members or to the mailing list in many doubts about our profession. And always got answers, new twists, precise, caring. As about dealing with hearing impaired students, or with dyslexia. We all can count on protocols and on advice from our Universities. But I needed the sound advice of mathematicians, and of caring ones at that. And by writing to the list, I always got it, to the bewilderment of my colleagues who keep struggling with the protocols. Some of the advice has become policies in my University.

Thank you EWM, keep up the good circulation of energy and information!

# Personal Memories of the Founding of EWM as a Finnish Association

BY MARJATTA NÄÄTÄNEN

In 1991 I had received a grant to visit Universidad Complutense in Madrid. By coincidence, I heard that a meeting of women mathematicians was due in Marseille, at a time that would suit well my travel plans. I had not heard of this group of women earlier and the news aroused my interest. So I decided to make a stop, which would not need extra funding, in Marseille. The French



*Photo courtesy of the University of Helsinki*

femmes et mathématiques had somehow succeeded in getting funds from various sources so that over 50 women could assist. Even an elegant reception was offered in the Mairie of the City of Marseille. Many contacts were made, the group consisted of a colorful, energetic and cheerful group of women from various parts of Europe, including many former Eastern block countries.

There was the intention to get EWM officially registered as an association, after several unofficial gatherings. The idea had come from the American AWM. But how to proceed and in which country should or could the association be registered? In Marseille, there were long and enthusiastic, even heated, discussions about the matter. Bodil Branner tried, in her cool Nordic manner to direct, the discussions and maintain cool and I remember Laura Tedeschini Lalli who spoke eloquently, waving hands. In 2016, at the Bridges meeting in Finland, we presented the original EWM video: Kari Hag could not come but fortunately, Laura Tedeschini Lalli, who was attending the conference, accepted to present in her place and it was good to meet her again.

Big countries did not seem to agree about where to found EWM, so small countries came up with a possible option. Someone, maybe Bodil, had heard that Finland had a legal system that made founding associations fairly simple. Since there was no strong opposition, I was asked if I could be included in a group to write the statutes in accordance with the Finnish law, with Caroline Series and other people. Long discussions about the rules were held and finally we agreed that all problematic issues were to be put in the by-laws to avoid legal difficulties.

Matters of discussion were, for example, rules for membership, for the selection and tasks of the Standing Committee and of regional committees and for the calling of extraordinary general assemblies when necessary. The complete statutes and documents can be found on the webpage of EWM, organization, documents. The group would continue working by e-mail. I remember how pleasant and easy it was to work with Caroline, who also had the advantage of being a native speaker of English, and I was proud of myself for having been able to assist in this process with legal terminology in English.

I remember the interesting discussions and the pleasant, inspiring atmosphere in this multicultural meetings. I remember that when discussing at dinner with Valentina Barucci from Rome, we were asked how it is possible for two people from so distant countries to agree so much. The cultural differences led to more investigation, and we decided to make a video, which was shot in Madrid 1995, with the indispensable help of Capi Corrales. I met with Kari Hag and Bodil Branner in 1996 in Copenhagen to cut it, and we somehow managed the finish the job even if none of us had ever done that kind of activity. There is more about the video in Trieste 1997 Proceedings. Now it can be found on the IMU pages, thanks to Ingrid Daubechies who continued our work by uploading the video there.

Many warm friendships and rewarding collaboration started and continued after that initial meeting in Marseille.

# CELEBRATING MARYAM MIRZAKHANI

BY AMI RADUNSKAYA AND LILY KHADJAVI

In July 2014, Maryam Mirzakhani made history as the first woman to win a Fields Medal, the most prestigious award in mathematics. Ruth Charney, then President of the Association for Women in Mathematics (AWM), remembered her feelings as she sat in the audience at the ceremony in Seoul, Korea: “At the end of the ceremony, all the Fields medalists, as well as the people presenting the awards were lined up on stage. In the center of the stage were three women: Park Geun-hye, the first female President of South Korea, Ingrid Daubechies, the first female President of the International Mathematics Union, and Maryam Mirzakhani, the first female Fields Medalist. I tend to be rather blasé about such things, but this one sent chills up my spine!”

Professor Mirzakhani’s achievements had repercussions around the globe. She became a celebrity in her birth-country, Iran. Hassan Rouhani, the President of Iran, [tweeted](#) two photographs of Maryam, one with, and one without a hijab: “Congrats to #MaryamMirzakhani on becoming the first ever woman to win the #FieldsMedal, making us Iranians very proud”.

When something so momentous and joyous occurs, we all feel a part of it: we were all very proud! When the news of Maryam’s death on July 14, 2017 reached us, we were devastated.

Kristin Lauter, past-President of the AWM, was sitting next to Ruth Charney at the ceremony in Seoul: “Many of us were cheering loudly from the audience and there was a sense of a real breakthrough and potential for change, and certainly an outpouring of emotion. The same outpouring of emotion has been palpable at the terribly sad news of her death these last few days.” In fact, Maryam had been diagnosed and treated for cancer before the ceremony in Seoul. Although she was able to attend the ceremony with her husband, Jan Vondrák, and daughter, Anahita, she left the event early, before delivering her lecture.

The Fields Medal was not the first of Mirzakhani’s accolades. She was a Clay Mathematics Research Fellow, she won the Clay

Research Award and the AMS Blumenthal award, and was elected a member of the French Academy of Sciences, the National Academy of Sciences and the American Academy of Arts and Sciences. She was a Professor in the Mathematics Department at Stanford University, where she inspired students and colleagues alike.

Maryam Mirzakhani was born in Tehran, Iran, in 1977. In a [film](#) made by the Simons Foundation and the International Mathematical Union, she describes herself as the “lucky generation” because, by the time she was a teenager, the Iran-Iraq war was over and opportunities were open to young people. She tells us that, as a girl, she was more excited about reading novels than doing mathematics, and thought she would be a writer. She was first drawn to mathematics because of its challenge, but then found that it was “really nice”, and that she enjoyed doing it. She was the first student in her all-girls high-school in Tehran to participate in the International Math Olympiad (IMO), where she became the first Iranian to win two gold medals, achieving a perfect score in 1995. By the time she was an undergraduate at the Sharif University of Technology in Tehran, Maryam must have begun to identify as a mathematician: she published three papers as an undergraduate, one of which is [cited](#) regularly by combinatorists. She went on to receive a Ph.D. from Harvard University, working under the supervision of Curtis McMullen. Her 2004 thesis quickly brought her recognition as a creative, even visionary mathematician. In this work, Mirzakhani solved two longstanding open problems, connecting the two together in a thesis that experts in the field describe as “truly spectacular”.

Maryam Mirzakhani attacked tough problems that required combining ideas from many mathematical areas: analysis, differential geometry, topology, dynamical systems and ergodic theory.

In graduate school, she became interested in the geometry of



Photo courtesy of IFP

the moduli space of hyperbolic surfaces. In her Ph.D. thesis, she calculated their volume, shedding insight on the size of the set of possible geometries on these surfaces. This work had far-reaching implications; for example, it led to a new proof of Witten's famous conjecture about quantum gravity.

In her 2013 paper “Growth of Weil-Petersson volumes and random hyperbolic surfaces of large genus”, she relates the behavior of lengths of simple closed geodesics on a hyperbolic surface to properties of the moduli space of such surfaces. In March of 2013, Maryam talked about this work in her plenary lecture at the second Association for Women in Mathematics (AWM) Research Symposium in Santa Clara, California, and at the January Joint Mathematics Meetings, she was awarded the Ruth Lyttle Satter Prize by the American Mathematical Society for “her deep contributions to the theory of moduli spaces of Riemann surfaces.”

In 2013, two papers appeared on the arXiv, co-authored by Alex Eskin and Amir Mohammadi, that explored geodesics on flat surfaces, rather than hyperbolic ones. They looked at





Photo: 2015 Springer Science+Business Media New York, Volume 27, No. 3, 2015

The Fields Medal awards ceremony, International Congress of Mathematicians (ICM), Seoul, 2014.

translation surfaces, a generalization of unfoldings of a rational polygon, and studied orbits that are preserved under shearing, stretching and compressing ( $GL(2, \mathbf{R})$  actions). (For more details, see the expository article by Alex Wright “From rational billiards to dynamics on moduli spaces”, *Bulletin of the American Mathematical Society*, 53(1), 2016)

In their “breakthrough” theorem, the authors showed, surprisingly, that these orbits are always “nice” sets: manifolds that are described locally by linear equations with real coefficients. This theorem has been called the “magic wand” theorem because it has many applications in physics and mathematics.

It has been predicted that many more applications for Mirzakhani’s theorems and techniques will be found in the years to come. She has given us an example of the passionate, private genius; she liked to tackle the more difficult problems, without fanfare. As a young colleague

writes: “In defiance of the (sound) advice given to most young researchers, Mirzakhani declared that she wished to

‘avoid the low-hanging fruit,’ instead of finding ambitious problems she could ponder for years at a time. Her unflinching eagerness to take on the most daunting problems, and her great success, was all the more notable given her unfailingly good-natured and humble personality.”

When the 2014 Fields Medalists were announced, Tim Gowers, a Fields medalist at Cambridge, wrote: “I am thrilled that this day has finally come. Although women have contributed to mathematics at the highest level for a long time, this fact has not been visible to the general public. I hope that the existence of a female Fields medalist, who will surely be the first of many, will put to bed many myths about women and mathematics, and encourage more young women to think of mathematical research as a possible career”.

Yes, certainly, there exist many myths about women and mathematics. One such myth is that women are under-represented in mathematics competitions such as the IMO or the Putnam because they lack ability or talent.

In fact, a cross-cultural study by Andreescu and colleagues shows that participation and performance by women in these contests are highly dependent on their country of origin. The authors conclude that some Eastern European and Asian countries consistently produce young women with profound ability in mathematical problem solving (as evidenced by success in international competitions), while most other countries, including the USA, do not.

Interestingly, children of immigrants to the USA and Canada from some of the countries that do well in the IMO, regardless of gender, are overrepresented among students identified as very gifted in mathematics; USA-born girls from all other ethnic/racial backgrounds, including white, are highly underrepresented.

The take-away message is that young women with talent and interest in mathematics exist, but they are not always recognized due to socio-economic and cultural factors.

In another study, Kane and Mertz consider several other myths, such as the greater male variability hypothesis or the theory that quantitative fields are not in line with a female disposition, which is drawn towards more nurturing fields such as teaching small children or nursing. Looking at data from many countries, educational systems, and cultures, these authors conclude that “gender equity and other sociocultural factors, not national income, school type, or religion per se, are the primary determinants of mathematics performance at all levels for both boys and girls.”

Signs of progress towards gender equity are apparent: in the 1960's, only 6% of mathematics PhDs in the US were given to women, in 1990 that percentage had risen to 18%, and by 2015 it was 31% (2015 Annual Survey of the Mathematical Sciences). The fraction of female Professors in mathematics departments at Ph.D. granting institutions in

the US is now up to 11%. While progress is evident, there is still a ways to go.

Maryam Mirzakhani wrote the following in 2013 in response to being awarded the Satter prize:

*“... in my opinion, the situation of women in math is far from ideal. The social barriers for girls who are interested in mathematical sciences might not be lower now than they were when I grew up. And balancing career and family remains a big challenge. It makes most women face difficult decisions which usually compromise their work. However, there has been a lot of progress over the years, and I am sure this trend will continue.”*

Let us celebrate this remarkable woman who courageously broke through the barriers to the pinnacle of achievement in mathematics. One way to celebrate Maryam Mirzakhani's life is to encourage and mentor young women pursuing mathematics. We hope that all of us in the mathematics community will support, protect, and uplift one other.

# IN FOCUS: FRANCE

BY COLETTE GUILLOPÉ

## The Teaching of Mathematics: What Can be Said Today About The Differences Between Women and Men?

Conference for the 30th anniversary of *femmes et mathématiques*

Paris, September 29-30, 2017

Throughout its history, the French association *femmes et mathématiques* (*Women and Mathematics*) has used its decennial anniversaries as an opportunity to raise awareness and discuss important issues with a wider community.

For the 10th anniversary in 1997, a one-day conference was organized about four remarkable contemporary female mathematicians, Yvonne Choquet-Bruhat (first woman elected to the French Academy of Science in 1979), Jacqueline Ferrand (1918-2014), Paulette Libermann (1919-2007) and Marie-Hélène Schwartz (1913-2013).

During the 20th anniversary, in 2007, Laurence Broze and Véronique Chauveau presented the first extensive statistical data showing the «disappearance» of female full professors in pure mathematics in France. Moreover, it was the first time that the works of the psychologists Steven J. Spencer, Claude M. Steele and Diane M. Quinn (1999) and Pascal Huguet (2002) about the stereotype threat were introduced to a large audience of mathematicians in France, as a tentative explanation of poorer performance of women in mathematics.

In 2017, for the 30th anniversary of the association, a two-day conference was organized: its objective was to try to understand the

reasons why women tend to avoid mathematically demanding higher education programs, despite good prior performance in the discipline.

The conference was a big success with more than 100 people present on both days. Furthermore, several high ranking officials from the Ministry of National Education attended the event, which is unusual in France. This shows that the question of scarcity of women in mathematics and science is taken seriously at the highest levels.

Anne Boyé (Centre François Viète, Nantes) and Michèle Artigue (Laboratoire André Revuz, Université Paris Diderot) discussed the differences in the mathematical education for girls and boys in the 2nd half of the 20th century and gave international benchmarks. Valérie Berthé (Institut d'informatique fondamentale, CNRS, and Université Paris Diderot) gave a wonderful talk about the Dynamics of Pisot Type and quasi-crystals.

The other talks discussed different points, such as the education of teachers, gender differences in student performance in mathematics, the PISA study, and gender stereotypes in science and in mathematics.

The exhibition «Women of Mathematics throughout Europe, a Gallery of portraits » was inaugurated during the conference at the Institut Henri Poincaré and stayed there for the month of October (see <http://womeninmath.net>).

*Scientific Committee:* Michèle Artigue, Laurence Broze, Edwige Godlewski, Simon Modeste, Fabrice Vandebrouck.

*Organising Committee:* Gautami Bhowmik, Annick Boisseau, Colette Guillopé, Monique Pontier, Véronique Slovacek-Chauveau, Brigitte Yvon-Deyme.

For more details and some talks (in French), see [http://www.femmes-et-maths.fr/index.php?page=blog\\_lire&id=220](http://www.femmes-et-maths.fr/index.php?page=blog_lire&id=220)

# Forum des jeunes mathématiciennes et mathématiciens

November 22-24, 2017

Organised every year with the support of the Mission for the Place of Women at the CNRS, this year's conference, set at the Institut Élie Cartan de Lorraine in Nancy, explored the topic of «Mathematics and Interactions». Four senior women gave talks on subjects as diverse as security and the use of logic, statistical approaches to the ecology of animal displacements, modeling financial risks, and modeling of metamaterials:

- Véronique Cortier (LORIA - CNRS, Nancy)
- Madalina Deaconu (IECL - Inria, Nancy)
- Marie-Pierre Etienne (AgroParisTech)
- Sonia Fliss (ENSTA).

Created in 1995, the forum is one of the few occasions for Ph.D. and postdoctoral students in mathematics to give a talk about their work. Eighteen mathematicians, mostly women, gave talks in statistics, probability, dynamical systems for biology and physics, computer science, and discrete mathematics.

Furthermore, this year, sociologist Sabrina Sinigaglia-Amadio (Université de Lorraine in Metz) gave a talk «Filles et mathématiques : une histoire de petites empêchées...» (Girls and mathematics: a story of little girls who are held back). Also, a small-group mentoring session was organized to help decipher the stereotypes in mathematics and science.

The exhibition «Women of Mathematics throughout Europe, a Gallery of portraits» was inaugurated during the forum at the Université of Lorraine and will stay there for a while. See <http://womeninmath.net>

*Organizing committee:* Anne de Roton, Anne Gégout-Petit, Régine Marchand, Irène Marcovici.

# International Conference on Sexual Harassment in Higher Education and Research

Paris, December 4, 2017

The association femmes et mathématiques organized this conference together with the ANEF (French Association for Feminist Studies), CPED (French Standing Conference of Gender Officers in Universities), Le Mans Université, Université Paris 8, Aix Marseille Université, Université Paris Diderot, and the French Ministry of Higher Education, Research and Innovation.

Planned for several months, this conference is taking place at a time when, in France and in the Western world, numerous cases of sexual harassment are being discovered and discussed in the media; this phenomenon concerns every part of the society, including student unions, and political parties of younger people.



There is still a lot to do in universities in France to develop a more welcoming professional milieu for women in general, and women mathematicians in particular.

For more information about the conference, see <https://violencesesr.sciencesconf.org/>

## Jacqueline Ferrand Prize

The Société mathématique de France (French Mathematical Society) has decided to establish a new prize in the honor of Jacqueline Ferrand (1918-2014): this prize will be awarded for the first time in 2018 to a pedagogical innovation in mathematics; the deadline for application is March 15, 2018. This prize is meant, in particular, to encourage the diffusion of mathematical knowledge towards a wide public.

See <http://smf.emath.fr/PrixAlembert-Ferrand/Candidature.html>



# GENDER GAP IN SCIENCE

PROGRESS REPORT | 2017  
BY MARIE-FRANÇOISE ROY

## Introduction to the Project

The project "Gender Gap in Science. A Global Approach to the Gender Gap in Mathematical, Computing and Natural Sciences: How to Measure It, How to Reduce It?" is a result of a large international and multidisciplinary collaboration. It will produce **sound data** to support the choices of interventions that ICSU and member unions can feasibly undertake. It will provide **evidence** for informed decisions, including trends – since the situation for women continues to change around the world, with some negative developments – and will provide **easy access to materials** proven to be useful in encouraging girls and young women to study and work in these fields. Regional information about careers, jobs, and salaries will be also provided.

The joint global survey is planned to reach 45,000 respondents in more than 130 countries using at least 10 languages, while the joint study on publication patterns will analyze comprehensive metadata sources corresponding to publications of more than 500,000 scientists since 1970. Contrasts and common ground across regions and cultures, less developed and highly developed countries, men and women, mathematical and natural sciences, will be highlighted.

More information can be found in the article that appeared in [EWM Newsletter 28](#).

## Activities During The Year 2017

### Initial Project Workshop

The workshop took place in Paris, at the UNESCO headquarters on June 1st and the Institute Henri Poincaré (IHP) on June 2nd and 3rd. Members of all participating scientific unions, as well as experts and the project's Advisory Board and Executive Committee (a total of 40 people), gathered during three days to discuss a global approach to narrowing the gender gap in mathematics and

## PROJECT REPORT

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Photo courtesy of "The Gender Gap in Science" Project

natural sciences as well as to share gender statistics from regional perspectives, and to define new indicators used to measure gender equality.

The workshop met its goals to identify sources of good practices; specify methodologies, objectives and research questions; discuss gaps in research on gender; identify data sources; and discuss management, organization and communication between partners. The agenda for the sessions included the global presentation of the project, presentation of the partners' activities with respect to the gender gap or women in science, presentation about specific situations in France and Russia, definition of the gender gap in science, organization of the regional meetings, and organization of the three project tasks.

### External Communication

During the workshop in Paris a small task group was formed and put in charge of the external communication about the project and its progress to the public. The group (led by Lucia Santamaria) created a website which was launched on

July 7th. The goal of the website, accessible at <https://icsugendergapinscience.org/>, is to create a permanent record of the project. It presents an extensive description of the project, its objectives, partners, structure, members, and tasks.

Furthermore, it is planned to provide continuous updates on developments in the project through posts and announcements. So far, we have created nine such posts addressing a variety of topics. The page has had ~7000 views from ~2000 visitors between July and December 2017.

Together with the website, the Twitter account <https://twitter.com/GenderGapSTEM> serves to disseminate news on the project and to foster engagement and conversation around gender-related topics. The Twitter account gained almost 300 followers between July and December.

Information about the project was given in the session dedicated to the Sustainable Development Goal No. 5

## PROJECT REPORT

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("Achieve gender equality and empower all women and girls") of the High Level Political Forum on Sustainable Development (HLPF) held in July at the UN headquarters in New York and at several events of our various unions.

### Task 1: Joint Global Survey

The goal of Task 1 is to measure the gender gap in science around the world, with the objective of promoting equality between men and women working in science. This survey, which will be conducted in 2018, aims to provide data on which to support decision-making, direct actions to attract and retain women in science and to develop and evaluate practical recommendations.

In 2009-10, the International Union of Pure and Applied Physics and the American Institute of Physics conducted the Global Survey of Physicists, comparing experiences of male and female physicists around the world. There were 14,932 respondents from 130 countries and 8 languages. The physics survey documented that there was inequality between men and women in career-advancing opportunities and in resources to conduct research.

The Statistical Research Center of the American Institute of Physics, directed by Rachel Ivie, conducts the Task 1 survey. Working together with partners in other unions, they will improve and extend the survey to chemistry, astronomy, biology, and mathematics. The survey will include men and women and will be conducted in multiple languages (at least French, English, Spanish, Chinese, Russian and Japanese).

To improve the knowledge of the gender gap in science around the world, we will compare across regions, countries, disciplines, countries' levels of development, and sectors of employment (academia, industry, government). We will also look at scientists' development of interest in science,

experiences in education and careers, family support, access to resources needed to conduct science, and opportunities to contribute to the scientific enterprise. The preparation of the questionnaire is underway, and it is currently tested in the three regional workshops before translation.

### Task 2: Joint Data-Backed Study on Publication Patterns

A group of data science professionals led by Helena Mihaljević is in charge of Task 2. The evaluation of three extensive bibliometric data sources, zbMATH, arXiv and SAO/NASA Astrophysics Data System (ADS), has been performed with respect to data content and coverage, data structure and programmatic access. The zbMATH data will serve as the main source on publications in mathematics, data from the arXiv will be used in particular to analyze areas in (theoretical) physics, and with data from ADS data, we will be able to study publication patterns in astronomy and astrophysics.

Research questions that will be tackled based on these data sources have been elaborated as well.

Contacts have been undertaken with providers of all three data sources to discuss data access in the project. We have reached a written agreement with FIZ Karlsruhe, the provider of the database zbMATH; access to arXiv requires no agreement, and the providers have offered support in accessing and analyzing their data. We have also received the permission to download the data from SAO-NASA and have been offered support throughout the project. The negotiations with Google Scholar, which we wanted to be the fourth and final data source, did not succeed. We believe that the BioRxiv (Preprints in Biology) or the DBLP (published works in Computer Science) would also serve as valuable data sources for this task.

Contacts have been undertaken with providers of all three

data sources to discuss data access in the project. We have reached a written agreement with FIZ Karlsruhe, the provider of the database zbMATH; access to arXiv requires no agreement, and the providers have offered support in accessing and analyzing their data. We have also received the permission to download the data from SAO-NASA and have been offered support throughout the project. The negotiations with Google Scholar, which we wanted to be the fourth and final data source, did not succeed. We believe that the BioRxiv (Preprints in Biology) or the DBLP (published works in Computer Science) would also serve as valuable data sources for this task.

The facilities for data hosting and computing in the cloud have been planned and are partly set up; the collection, pre-processing and storage of arXiv and ADS data have already been initiated.

### **Task 3: Database of good practices**

A small group led by Marilyn Goos from the IMU International Commission on Mathematical Instruction is currently testing an enquiry template for gathering information on examples of initiatives in order to finalize the structure of the database.

### **Regional Workshops**

One important activity is the organization of three regional workshops in Taiwan (National Taiwan Normal University, Nov 7-8), Colombia (Universidad de los Andes, Nov 22-24) and South Africa (AIMS South Africa, Dec 1-2).

The workshops' objectives are to inform diverse regional science communities about the project, present its tasks, make contacts with the people that are instrumental for the success of the project, and get input from Asia, Latin America, and Africa to ensure the project is responsive to

local realities.

Additionally, these workshops aim at organizing the dissemination of information about the project in Asia, Africa, and Latin America and to encourage active participation of individuals and organizations of these regions in Task 1 and Task 3. A total of 38 delegates from 12 countries and 9 partners were present in the workshop in Taiwan.

The Latin American Regional Workshop was held immediately after the Workshop on Professional Skills for Young People in Science and Engineering also at Universidad de los Andes. The workshop was attended by 30 people from 10 countries and 8 partners were represented. A total of 39 delegates from 17 countries participated. Of these, 34 were women and 5 were men. Of the 11 partners, 10 were represented in the workshop at the African Institute of Mathematical Sciences in Cape Town. In all cases, eager contributions from all attendees, insights from different disciplines and countries were shared, further helping refine the global survey to be culturally appropriate both in terms of language as well as in substance.

### **Project partners**

The project has been approved by the ICSU for the period 2017-2019, led by the IMU and the IUPAC and coordinated by Marie-Francoise Roy, the chair of the Committee for Women in Mathematics and Mei-Hung Chiu, a bureau member of IUPAC. It has nine other partners : five ICSU unions, the IUPAP, the IAU, the IUBS, the ICIAM, the IUHPST and four international organizations: UNESCO, GenderInSite, the OWSD and the ACM.



# REPORTS

## Young Women in $C^*$ -Algebras (YWC $^*$ A)

Copenhagen, August 5-6, 2017

WRITTEN BY THE ORGANISERS OF YWC $^*$ A

A [recent survey](#) of arXiv papers suggests that no more than 15% of active researchers in operator algebras and noncommutative geometry are women. In an attempt to improve this gender imbalance, the first edition of Young Women in  $C^*$ -Algebras (YWC $^*$ A) was organised. It took place at Copenhagen University on August 5-6 2017, the weekend before the annual Young Mathematicians in  $C^*$ -Algebras event.

This short workshop was organised by Francesca Arici (Radboud University Nijmegen, NL), Sara Arklint (Copenhagen University, DK) and Elizabeth Gillaspy (formerly University of Münster, DE, now at the University of Montana, US) with the scope to highlight and promote the research of women working in  $C^*$ -algebras and related fields (such as von Neumann algebras, quantum groups, and noncommutative geometry).

YWC $^*$ A works towards improving retention of women in operator algebras by:

- building an international network of women researchers in  $C^*$ -algebras and related fields;
- offering young women researchers a friendly environment to practice in presenting their research, or to ask questions about the next steps in their professional career;
- increasing awareness among male researchers of the achievements and experiences of women in  $C^*$ -algebras.

## PAST EVENTS

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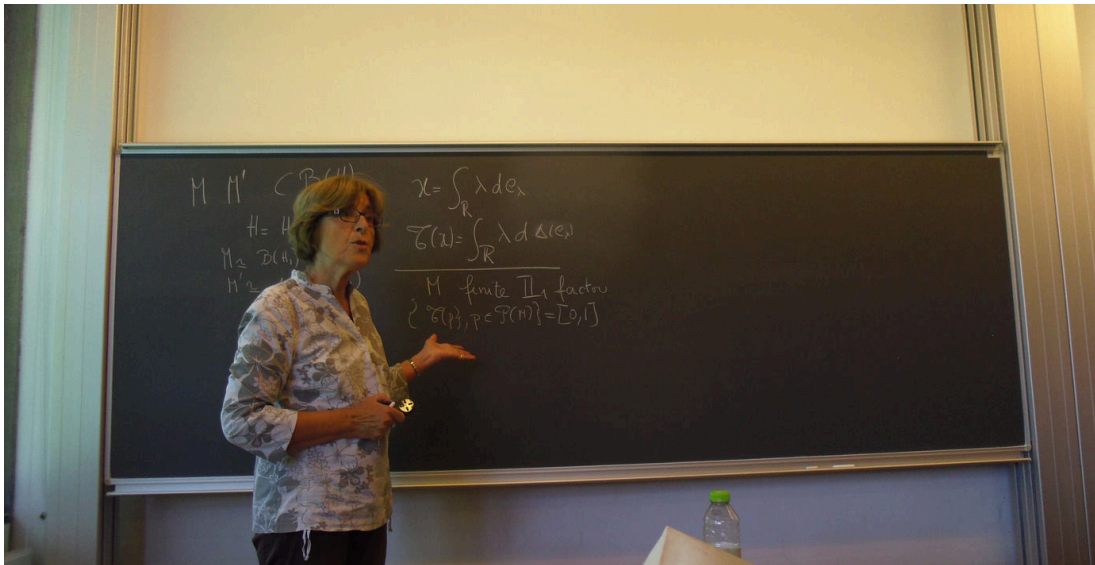


Photo courtesy of YWC\*A

Women working in operator algebras are worldwide, from Uruguay to Korea and Mexico to Romania and 23 women and 8 men traveled from across Europe as well as from Japan, Israel, Iran, and the United States to attend YWC\*A.

The workshop included a mini-course by Magdalena Musat (Copenhagen University) on Quantized functional analysis, tensor norms and the Grothendieck program, and a colloquium-style talk by Claire Anantharaman--Delaroche on the history of Type  $\text{II}_1$  factors. Some of the participants also spoke about their own research in a 30-minute presentation.

Alongside the scientific program, we also organized mentor group discussions during the lunch breaks, where the female participants had the chance to discuss topics including work-life balance, sexism in academia, working with research collaborators, and many others.

The social activities, which included a dinner and a boat tour of Copenhagen, contributed to a relaxed and friendly atmosphere and helped in forging connections among the participants.

Though all of our speakers and organizers were women, we encouraged male mathematicians to attend YWC\*A as well. Indeed, in our opening remarks for YWC\*A 2017, we explicitly thanked the men in attendance for supporting their female colleagues and asked them to continue their active support even after the end of the conference.

An evaluation form was sent out shortly after the event and we got very positive feedback from the participants. The relaxed atmosphere made the participants feel at ease and confident in asking questions:

*The atmosphere of women supporting other women was great.*

*I felt comfortable asking questions or talking about my work.*

*In the future, I will not feel the need to be so cautious about giving talks at conferences. It has made me feel like presenting one's research that is independent or collaborative, regardless of the stage it is in, can be a really beneficial experience. I will also not feel so self-conscious at conferences that are significantly male-dominated.*

## PAST EVENTS

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Photo courtesy of YWC\*A

Some comments addressed the feeling of isolation that women in operator algebras very often experience:

*Of course, being one of four women at a conference with a hundred attendees is typical in operator algebras, but YWC\*A made me feel like I was not a minority.*

*It is an incredible opportunity to meet with women who work on maths at least loosely related to your own. There is a lot of confidence that be gained by seeing successful women at all stages of their careers and then getting to talk with them and hear their experience. It makes you feel like you're not experiencing these challenges alone, and it is possible for you to achieve the goals you have in mathematics.*

*I will value the role that I play as a woman in mathematics and be confident that I have something to contribute to the field. I will try no longer to downplay my gender but embrace the idea that my perspective, as a woman, can positively affect the teaching and learning of  $C^*$ -algebras.*

*I have found that there are a lot more women working in my research area and find this empowering.*



# On the Trail of Women in Mathematics

Rzeszów, June 22-24, 2017

WRITTEN BY STANISŁAWA SKANAS

The first conference from the pioneering cycle “On the Trail of Women in Mathematics” took place on 22nd-24th of June 2017 in Rzeszów (Poland). The conference was organized by [Polish Women in Mathematics](#) and celebrated the centenary since the birth of Professor Helena Rasiowa, who was one of the most prominent female Polish mathematicians of the twentieth century. This scientific meeting was opened to the whole Polish mathematical society. Foreign mathematicians also participated in the conference leading up to around 100 participants.

Helena Rasiowa started her academic career during World War II, working under the supervision of Jan Łukasiewicz (one of the main leaders of the Polish School of Logic) and Bolesław Sobociński. However, her Master's thesis burned with her house. After the war, she was rediscovered by Andrzej Mostowski, who was her MSc and Ph.D. supervisor. Her work includes topics such as proof theory and deductive logic, algebraic methods in logic and algebras related to logics, classical and non-classical logics, algorithmic and approximation logics, and artificial intelligence.

More on her research and institutional activities could be found here:

<https://www.mimuw.edu.pl/%7Emrr/Rasiowa/RasiowaBiogr/RasiowaBiogr.htm>

<http://www-history.mcs.st-andrews.ac.uk/Biographies/Rasiowa.html>

<http://comet.lehman.cuny.edu/fitting/bookspapers/pdf/papers/Rasiowa.pdf>

Professor [Zbigniew Ras](#) (the University of North Carolina at Charlotte), the son of Prof. Helena Rasiowa, was a special guest and Honorary Chair of the Scientific Committee of this conference. As a specialist in data-mining, health informatics, and business analytics, he delivered an opening lecture titled “Can data science regulate the cost of artworks?”.

The first day of the meeting was entirely devoted to the legacy of Professor



Photo courtesy of Wikipedia

## PAST EVENTS

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Photo courtesy of the Polish Women in Mathematicse

Rasiowa, her life, and scientific achievements. During the following days, scientific plenary lectures, as well as talks devoted to Rasiowa, took place. The talks were presented by former students and collaborators of Prof. Rasiowa, whose wide group attended the conference.

List of talks devoted to Prof. Rasiowa:

- Janusz Czelakowski: "Algebraic semantics in perspective of Prof. Helena Rasiowa."
- Andrzej Salwicki & Grażyna Mirkowska: "Contribution of Prof. Helena Rasiowa to the basis of computer science".
- Marek Zawadowski: "Algebraic and categorical methods in logic".
- Andrzej Jankowski: "Presentation of the personage and achievements of Prof. Helena Rasiowa".
- Einar Fredriksson: "Remembering Professor Rasiowa. Stanisław Domoradzki: Helena Rasiowa (1917-1994). School years and difficult student years. Her active organizational activity".

The plenary lectures and special sessions concerned a wide range of research areas: differential equations, applied mathematics, topology, graph theory and didactic of mathematics.

The special session for young mathematicians was a success; the poster session and discussion panel "The way to success

in professional work" were also important points in the conference schedule.

Other plenary lectures:

- Ryszard Rudnicki: "Piecewise deterministic processes and their asymptotics".
- Urszula Ledzewicz: "Optimal control in biomedicine and pharmacology. Results and open problems".
- Wiesława Nizioł: "p-adic Hodge Theory – a survey".
- Ewa Damek: "Affine random equation with triangular matrices".
- Katarzyna Szymańska-Dębowska: "Non-local boundary problems for ordinary differential equations".
- Agnieszka Bartłomiejczyk: "Analysis of the model of Hes1 gene expression".

The conference organized by the Polish Women in Mathematics was planned as the first in the cycle "On the Trail of Women in Mathematics" and was a great success. The cycle will be continued. in the future: there are many women who achieved much in the field of mathematics, and we believe it is essential to honor them and to highlight their history and achievements.

More details can be found on the conference web page:

<http://konferencja.ptkwm.org.pl/> together with slides from the plenary lectures and a gallery of photos.



# Women and Science V

Duzce, November 27 , 2017

WRITTEN BY SEMRA PAMUK

The Association for Turkish Women in Mathematics started Women and Science meetings with the aim of bringing women researchers and students together and creating a platform for sharing their ideas, experiences, and problems.

The first one was held at Cankaya University in Ankara on November 23, 2012, the second was at Bahcesehir University in Istanbul on 8 February 2013, the third was on October 30-31, 2015 at Hitit University, in Corum and the fourth one was at Atilim University on November 4, 2016. Our fifth Women and Science meeting took place on 27 November



Photo courtesy of ATWM

2017 at Duzce University, in Duzce with the support of DUKAM (Center for Women Studies at Duzce University).

The program consisted of three talks and a panel with the theme "Women at every stage of education". The first panelist was Prof. Ayşe Soysal, who is a former rector of Bogazici University and a mathematician: she shared her experiences as rector. The second one was Prof Funda Sivrikaya Serifoglu, who is founding rector of Duzce University: she talked about female leadership in higher education. The last panelist was Assistant Prof Şule Ay from DUKAM and she gave a presentation about the role of women in education.

The invited speaker Prof El Yacoubu Nouzha, President of the African Mathematical Union (AMU) from University Mohammed V inRabat, Morocco, gave a very interesting talk about the challenges that African women mathematicians face in developing science, technology, and innovation.

## PAST EVENTS

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In addition to gender-related issues, the meeting also covered the latest research trends in Turkey. For example, Prof Lale Akarun from Department of Computer Science, Bogazici University, talked about facial and sign language recognition based on geometric features extracted from three-dimensional data sets. Prof Ayse Humeyra Bilge from Kadir Has University talked about mathematical models of epidemic diseases.

The event was open to everyone, no registration fee was required. There were nearly 100 participants.



Photo courtesy of ATWM

# Connections for Women: Geometric and Topological Combinatorics

Berkeley, CA, August 31 -September 1, 2017

WRITTEN BY OLGA KUZNETSOVA

Connections for Women Workshop was part of the semester-long program on Geometric and Topological Combinatorics at the MSRI in Berkeley, CA. The goal of the event was to introduce a variety of topics to preview the major research themes of the program.

In general, the field of geometric and topological combinatorics covers two main areas: the study of combinatorial properties of geometric and topological objects such as matroids, polytopes and lattices; and the development of geometric and topological techniques to answer combinatorial problems.

The program featured a wide range of topics: from models of a realization space of a polytope to applications of topology in political science and the triangulation of manifolds. All lectures are available online via <http://www.msri.org/workshops/812/schedules>. My personal highlight was the talk by Caroline Klivans, who presented her joint work with Juliana Freire, Pedro Milet and Nicolau Saldanha on the connectivity of three-dimensional domino tilings, which I summarize below.

Outside of the auditorium, the organizers provided a lot of excellent opportunities for networking: a cozy, perfect-for-chatting eating area, a dinner on the first night and, overall, a very friendly atmosphere.

I also enjoyed the panel discussion, which was very candid and practical. Some of the tips that stayed with me were:

- surround yourself with nice people and you will enjoy the environment;
- be confident (you are not an imposter!) and demand what you deserve, for example, during salary negotiations (one of the panelists recommended “Women Don’t Ask” by L. Babcock on the topic);
- outsource and buy services if that makes your life easier and don’t feel bad about “wasting money” on such things (e.g., if you have an important talk in the morning and you just flew in the night before and it takes you an hour to get to the hotel – get a cab);
- acknowledge the contribution of women (and other minorities) in group discussions – women often feel “invisible”, when their contribution is only noted after it is repeated by a man who in the end also gets credit for it.

I would like to thank Aalto University for making this trip possible.

### THREE-DIMENSIONAL DOMINO TILINGS

The theory of tilings has its roots in combinatorics, probability, and statistical physics. In the case of two-dimensional tilings, many fundamental questions have already been answered. For example, we know how to calculate the number of tilings in a given region (Kasteleyn '61, Temperley and Fisher '61); how a random tiling looks like (Jockush, Propp, Shor '95); and how and when it is possible to move from one tiling to another (Thurston '90).

Unfortunately, everything becomes much more complicated in three dimensions. For example, consider a local move called flip, where we take two dominoes (i.e.,  $2 \times 1 \times 1$  bricks of two adjacent cubes) out and put back rotated within a  $2 \times 2 \times 1$  block. It turns out that any two-dimensional tilings of a simply connected region are flip connected (Thurston). However, one can construct  $3 \times 3 \times 2$  boxes where no flip move is possible.

Naturally, it feels limiting to manipulate three-dimensional spaces exclusively with two-dimensional moves. For example, we could use a

three-dimensional move, called trit, that allows changing the orientation of 3 dominoes, similar to rearranging vectors from the right-hand rule to the left-hand rule. While it is not possible to move between three-dimensional tilings using flips and trits in general, the authors were able to characterize the tilings that are connected.

To this end, Klivans and her co-authors introduced two topological invariants: flux and twist. Flux can be thought of as flow across surfaces and twist is knottedness by trits. Furthermore, they applied the notion of refinement, where we allow the dominoes to be decomposed into smaller units (e.g., each cube is decomposed into  $5 \times 5 \times 5$  smaller cubes). Initially, one may think that given enough decompositions one could always connect any three-dimensional tilings. This is however not true. The authors showed that any two three-dimensional tilings are connected via refinements, flips and trits if and only if they have the same flux. Similarly, two three-dimensional tilings are connected via refinements and flips if and only if they have the same flux and twist.

# Second Meeting of Pakistani Women in Mathematics

Peshawar, November 21, 2017

The aim was to provide a stimulating intellectual environment for women academicians from all over Pakistan in different mathematical disciplines, in order to promote active careers as researchers for women in the mathematical sciences. The first meeting took place in Islamabad in 2014.

The flyer of the meeting can be found here:

[http://www.europeanwomeninmaths.org/sites/default/files/documents/news/pwm\\_uop\\_2017\\_flyer.pdf](http://www.europeanwomeninmaths.org/sites/default/files/documents/news/pwm_uop_2017_flyer.pdf)



# NEWS AND UPCOMING EVENTS

## Appointments

### **Sylvie Benzoni named the new Director of the Institut Henri Poincaré**

Sylvie Benzoni will start as the new Director of the Institut Henri Poincaré in Paris on 1st January. Founded in 1928, the IHP is a highly prestigious centre of mathematics, an institutional member of the EMS, and an ERCOM Centre (European Research Centres in the Mathematical Sciences).

Sylvie Benzoni is an internationally recognised expert in partial differential equations as they relate to fluid dynamics and phase transitions. She has been a professor at the Université Claude Bernard in Lyon since 2003, and director the of the Institut Camille Jordan since 2016. She is also a serving member of the EMS's Committee for Raising Public Awareness of Mathematics.

### **Alice Guionnet elected to the French Academy of Science and Academia Europaea**

Alice Guionnet, Research Director at CNRS, Director of the mathematics laboratory (UMPA) at Ecole normale supérieure de Lyon, has been elected to the French Academy of Science and the Academia Europaea. Altogether, out of 333 members in Mathematics, Computer Science, Mechanics, Physics, Chemistry and Biology in the French Academy of Science, 32 are women, including five mathematicians.

As for her domain of research, she says: "Most of my research is motivated by the understanding of the global behaviour of systems in high dimensions, often coming from physics, using techniques from large deviations or coercive inequalities. From this theme, deviations to combinatorics, free probability or PDE's occurred and were (and hopefully will still be in the future) rather enjoyable."

### **EWM The Netherlands at the Dutch Mathematical Congress (NMC) 2018**

EWM The Netherlands was invited to participate in the programme committee of the [National Mathematical Congress 2018](#). The board decided to give this role to Maria Vlasiou (Eindhoven University) for 2018 and reevaluate this choice for the future, should EWM-NL be invited by default in the PC of NMC.

# Prizes and Awards

### **Raphaèle Herbin receives the CNRS Medal for Innovation**

Raphaèle Herbin, Professor at Aix-Marseille Université and the Director of the Institut de mathématiques de Marseille, has received in June 2017 one CNRS Medal for Innovation for her work in numerical analysis for mathematical problems related to nuclear safety.

### **Annalaura Stingo and Tahina Ralitera receive the L'Oréal-UNESCO French grant for Women and Science**

Two PhD students in mathematics and computer science received a L'Oréal-UNESCO French grant for Women and Science. These grants are very selective for there are only 30 women PhD or post-doctoral recipients among more than 1,000 women applicants in exact and natural sciences in France.

**Annalaura Stingo** (Laboratoire d'analyse, géométrie et applications, CNRS and Université Paris-Nord), who started her mathematical education in Italy, is interested in the Klein-Gordon equation modeling the nonlinear interactions between a non-massive field such as a wave, and a massive field, such as a quark.

**Tahina Ralitera** (Laboratoire d'informatique et de mathématiques, Université de la Réunion, in one of the French islands in the Indian Ocean), from the region of Antananarivo, the capital city of Madagascar, is interested in the modeling and computer simulations of the movements of electrical vehicles, for example how to optimize the locations of the electricity chargers in a city or in an island.

### **Jacqueline Ferrand Prize established**

The Société mathématique de France (French Mathematical Society) has decided to establish a new prize in the honor of Jacqueline Ferrand (1918-2014). This prize will be awarded for the first time in 2018 for pedagogical innovation in mathematics. The deadline for application is March 15, 2018. This prize is meant to encourage the diffusion of mathematical knowledge among the wide public.

See <http://smf.emath.fr/PrixAlembert-Ferrand/Candidature.html>

### **L'Oréal-UNESCO UK and Ireland Fellowship for Women In Science**

The 2018 L'Oréal-UNESCO UK & Ireland Fellowship for Women in Science is open for applications till February 16, 2018.

The fellowship is meant for female early-career researchers working in the fields of life and physical sciences, engineering, mathematics and computer sciences. Five outstanding scientists will be awarded a bursary of £15,000.

This unique award is designed to provide practical help to aid female researchers in continuing their cutting-edge research. The fellowship can be spent as the fellow wishes; it could buy a piece of scientific equipment, help to cover child care costs or be used to fund conference travel.

Official website : [www.womeninscience.co.uk](http://www.womeninscience.co.uk)

## PRIZES AND AWARDS

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### **Francesca Arici wins In'to Stories award**

Congratulations to the board member of EWM in the Netherlands, Francesca Arici, who won the "In'to stories: Make your research come alive" competition organised by Radboud In'to languages to celebrate their 25-year anniversary. Francesca was one of the four selected finalists and gave a presentation about being a researcher in mathematics at the In'to languages lustrum event at the Vereniging in Nijmegen. The award is accompanied with prize money and a language course from Radaboud In'to.

### **Caroline Jagtenberg wins Jo van Nunen award**

Caroline Jagtenberg at the Centrum Wiskunde & Informatica in Amsterdam won the renowned Jo van Nunen Award for her doctoral thesis "Efficiency and Fairness in Ambulance planning", written under the supervision of Rob van der Mei. The Jo van Nunen Award is an annual award for research that strengthens the reputation of logistics and supply chain management in the Dutch industry and makes meaningful links between theory and practice. The award is an initiative of the vLm, an association of logistics managers in the Netherlands.

### **Nelly Litvak: finalist of "Enlightener" award**

In November, the prestigious Enlightener Prize for the best popular science book in Russia was awarded. The book "Who needs mathematics? A clear book about how the digital world works" written by Nelly Litvak, professor at UTwente and TU Eindhoven and EWM representative in the Netherlands, and Andrei Raigorodsky, a renowned professor and popularizer of mathematics in Russia, was one of the last eight nominees in the category of best non-fictional literature of 2017.

Litvak explains: "It is a book for the general public about applications of mathematics in digital technologies. The book covers many topics, including planning and scheduling, coding theory, robustness of the Internet, load balancing in web servers, probabilistic counters, cryptography and online auctions."

### EWM Mentoring

EWM members in need of guidance could communicate with senior mathematicians (preferably holding a tenured position and being EWM members) regarding their mathematical career, and balancing career and family.

In order to establish connections between mentor and mentees, interested parties from both sides should contact:  
[contact@europeanwomeninmaths.org](mailto:contact@europeanwomeninmaths.org)

Several members of the EWM Standing Committee will make the matching by taking into account information such as working fields and possible preferences of the mentees.

EWM will track the progress of a mentor-mentee team via the responsible Standing Committee members, who will contact the team from time to time to get status information.

In case the proposed matching does not work, the mentee or the mentor will notify the responsible Standing Committee members and will ask for a new matching.

The mentoring registration system is intended to work via the (new) EWM website at a later stage, instead of the initial email based framework.

We look forward to receiving registrations of interested mentees and mentors!

# Upcoming Events

### **World Meeting for Women in Mathematics - (WM)<sup>2</sup>, a satellite event of the ICM 2018 – July 31, 2018, Rio de Janeiro**

The IMU Committee for Women in Mathematics (CWM) welcomes the mathematical community to the World Meeting for Women in Mathematics - (WM)<sup>2</sup>, a satellite event of the ICM 2018.

The (WM)<sup>2</sup> will take place at Riocentro convention center on July 31, 2018. Its program includes research talks, group discussions about gender issues in mathematics, a panel discussion and poster presentations. There will also be a tribute to Maryam Mirzakhani.

*Key note speaker:* Monique Laurent (Centrum Wiskunde & Informatica and Tilburg University, Netherlands)

*Invited lectures:* Alicia Dickenstein (Universidad de Buenos Aires, Argentina), Salomé Martínez (Universidad de Chile, Chile), Maria Eulália Vares (Universidade Federal do Rio de Janeiro, Brazil)

*Public lecture:* Maria Esteban (Université Paris-Dauphine, France)

To propose a poster, participants must submit an abstract through the registration form by February 28, 2018

Participants from developing countries who are interested in attending both (WM)<sup>2</sup> and ICM are encouraged to apply for the

Open Arms Travel Grants Program. Further limited funding is available and should be applied for by February 28, 2018.

Official website: <https://www.worldwomeninmaths.org/>

### **EWM General Meeting - September 3-7, 2018, Graz, Austria**

Registration is now open for the next EWM General Meeting that will take place in Graz, Austria between September 3-7, 2018 and it is possible to express the interest in giving a talk or presenting a paper. A preliminary schedule has been published. Early bird registration ends in April.

*EMS speaker:* Gigliola Staffilani (MIT)

*Invited speakers:* Shiri Artstein-Avidan (Israel), Ilse Fischer (Austria), Alice Guionnet (France), Frances Kirwan (UK), and Maryna Viazovska (Switzerland and Ukraine)

There will be three mini-symposia sessions covering nine streams: optimisation, PDEs, frame theory and asymptotic analysis, mathematics and music, algebraic geometry, logic, linear operator theory, mathematics in industry, and non-smooth PDE-constrained optimisation. Participants wishing to contribute are encouraged to contact the minisymposium organisers.

The program will also feature a lecture on gender balance. This year, Naomi Ellemers, Distinguished University Professor in social psychology from the University of Utrecht, has agreed to speak on “unconscious bias and modern forms of discrimination”.

## UPCOMING EVENTS

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To facilitate networking among participants, the organisers will arrange a reception, a round of introductions, and round tables for discussing different topics around women in mathematics.

EWM offers a limited number of travel and accommodation grants for female mathematicians from developing countries. Requests for support may be made when registering for the meeting.

Official website: <https://sites.google.com/site/ewm18/>

### **WOA: Women in Operator Algebras – November 4-9, 2018, Banff, Alberta**

The Banff International Research Station for Mathematical Innovation and Discovery invites participants to the first “Women in Operator Algebras” workshop that will take place in Banff, Alberta between November 4-9, 2018. The purpose of the workshop is to encourage collaboration among women in the field of operator algebra, which has suffered from a severe gender imbalance, even compared to other fields of mathematics.

Participants will work in small groups led by two co-leaders. Before the start, each pair of co-leaders will design a research project, and provide background reading for their group. The workshop will start with brief lectures about the selected research problems. At the end of the workshop, each group share their progress and propose future directions for work.

Projects:  $C^*$ -algebras and topological dynamics,  $C^*$ -algebras of graphs and higher-rank graphs, wavelets and spectral triples,  $C^*$ -algebras of ample groupoids, equilibrium states on the  $C^*$ -algebras of semigroups, Baum-Connes theory, geometric operators and higher indices, secondary invariants.

Official website: <https://www.birs.ca/events/2018/5-day-workshops/18w5168>

### **Summer Research for Women in Mathematics at the MSRI – June 11, 2018- August 03, 2018, Berkeley**

MSRI invites proposals for the Summer Research Program for Women in Mathematics. The purpose of the program is to provide space and funds to groups of women mathematicians to work on a research project at MSRI. Research projects can arise from work initiated at a Women’s Conference, or can be freestanding activities.

Groups of two to six women with partial results on an established project may apply to the program. Each member of the group must have a Ph.D. in mathematics or an advanced graduate standing. Each group may apply to be in residence at MSRI for a minimum of five working days, though a longer period of two-weeks is preferred. The visits must take place between June 11, 2018 and August 3, 2018.

The proposal should be submitted by email to [p329@msri.org](mailto:p329@msri.org). The deadline for application is February 1, 2018. Financial support for travel and local expenses will be provided.

Official website: <https://www.msri.org/programs/329>



## UPCOMING EVENTS

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### **Connections for Women Workshops at the MSRI**

All MSRI Programs feature Connections for Women Workshops, intensive two-day workshops at the beginning of each semester that cover the major topics of the program. Limited funding is available and funding awards are typically made 6 weeks prior to the workshop.

Upcoming programs in 2018: Group Representation Theory and Applications, January 16, 2018- May 25, 2018; Enumerative Geometry Beyond Numbers, January 16, 2018- May 25, 2018; Hamiltonian systems, from topology to applications through analysis, August 13, 2018 - December 14, 2018.

Official website: <http://www.msri.org/web/msri/scientific/programs>

### **IAS Program for Women and Mathematics “Mathematics of Modern Cryptography”- May 19 - May 25, 2018, Princeton**

The IAS Program for Women and Mathematics celebrates its 25th anniversary. This year the program will focus on modern cryptography. The program consists of two courses: beginner “Mathematics in Cryptography” by Toni Bluher, NSA and advanced “Mathematics of Post-Quantum Cryptography” by Kristin Lauter, Microsoft Research.

Application deadline is on February 17, 2018 and participants will receive support for lodging, meals and transportation. There is also a child care fund designed to support attendees with children.

Official website: <https://www.math.ias.edu/wam/2018>