**Exhibition opening in Bonn, November 10th 2016**

**An exhibition coming of age**

The exhibition which we are about to open has not reached four months of age, and yet has a history and stories to tell. It was officially born on July 20th at the Technical University in Berlin, and travelled from there to the University of Potsdam, where it was originally conceived and which hosted a second opening on October 19th. Its birth in Berlin was accompanied by two pieces of music composed by Elena Mendoza, professor at the University of the Arts in Berlin, and German women composers of the Romantic, Fanny Hensel, Luise Le Beau and Emily Mayer, accompanied its first steps in Potsdam. This exhibition is now on its first trip outside its home Berlin-Brandenburg region, and this time, with a video performance to accompany its opening.

Let me thank **Claire Glanois, Jacinta Torres** and **Christian Blohmann** for the remarkable organisation of this opening in Bonn and the Max Planck Institute for hosting the exhibition. Claire and Jacinta merged in a very poetic video performance, landmarks of the history of women's rights, achievements of women mathematicians, quotes of women on women in society and history, might they be by female novelists or feminist writers, this illustrated by drawings by Jacinta and accompanied by music put together by Claire. My congratulations to Claire and Jacinta.

A video performance is an appropriate style to symbolize its emancipation before the exhibition goes abroad, first to France, Clermont-Ferrand, Marseilles and Paris, and then over the Channel to Britain and further. Thanks to the invitation of the Max Planck institute, I am here for the farewell before its long trip. But as is to be nowadays expected, the exhibit has already crossed the border virtually, in September with a venue in Russe, Bulgaria, last month with a venue in Strasbourg and Paris XIII in the north of Paris, and coming up soon

is an opening in Rome--  this ubiquity thanks to the virtual pdf copies of the exhibition available on request.

Let us go back to its prehistory; its ancestor is a small hand-made booklet with 10 portraits of women mathematicians around the world.
I am very happy to see in the audience today, a young post-doc I met in Beijing in 2014 when presenting posters based on this little booklet, that I had brought with me to China.
Returning to the booklet, in 2013, in preparation for a talk I had been asked to give at the University of Konstanz on “Women and mathematics”, I wrote to ten female mathematicians I know around the world, asking them to answer a set of questions related to their careers. I assembled the replies, together with a photograph of each mathematician, in a booklet entitled “Women mathematicians around the world. A gallery of portraits”. The positive response these interviews received from the mathematical community encouraged me to ask Agnes Handwerk, the author of various documentary films on mathematicians, amongst which one on Yuri Manin, whether she was willing to work with me on a film project based on this document. Instead, Agnes suggested to use the booklet as a starting point for a more ambitious exhibition project at the 7th European Congress of Mathematics - and thus the project was born.
Little did I realize then what an enterprise and adventure this was going to become!
This time, I contacted thirteen women mathematicians around Europe, some of whom like **Karin Baur** from Austria and **Dusanka Perisic** from Serbia, had participated in the previous set of interviews. Let us listen to **Dusanka**’s comments on her participation*: I am thankful for this project, because it gave me the opportunity to think back. Rarely do I do that, and in retrospect, I consider myself lucky: I had the opportunity to teach, to have children, to be successful.*

I am also happy that this project could come to life in spite of the many obstacles we had to overcome, the major one being finding funding sources when we were getting no support from the mathematical community. We are all the more thankful to the Humboldt Foundation

which very much supported the project with the “Humboldt Alumni Award 2015 for innovative networking initiatives” granted to **Alexandra Antoniouk**, coinitator of this project. After the tough initial phase of fund searching, searching followed another intense experience: the interviews, carried out by the photographer Noel Matoff and myself and sometimes Sara Azzali, whether in Turku, Finland with **Kaisa Matomäki**, in Tarnovo, Bulgaria with **Stefka Bouyuklieva** or in Cortona, Italy with **Katrin Wendland** from Germany and **Kasia Rejzner** from York. We have unforgettable joyful memories of this project. The enthusiasm expressed by all the portrayed women mathematicians for their art, whether on the photographs taken while they were explaining “their mathematics” to us or in the interviews when asked whether they had any regrets to have chosen mathematics, is contagious. Here is a comment by **Karin Baur** *“I am happy and have no regrets. Mathematics is a world you can dive into. I like exploring and you can learn every day from doing research, you can invent new words, new ideas. Choosing a problem is like picking out a chocolate from a chocolate box; you choose it according to your own taste.”* This unconditional love for mathematics is exemplified by **Dusanka Perisic’s** answer “*Je ne regrette rien*”. I believe that this very positive attitude of the portrayed women served as a driving force for the curating team for this exhibition, **Sara Azzali, Magdalena Georgescu, Noel Matoff** and myself to overcome the lack of support we experienced along the way. “*Nous ne regrettons rien!.”*

Like the previous booklet, this exhibition was intended to put women mathematicians in the foreground, not only their mathematical performances, but also them as human beings, with their hopes, doubts and deceptions. All are very active and dedicated mathematicians, some of them with outstanding performances as researchers, others contributing to mathematics in a more modest way, thus reflecting the diversity of paths followed by researchers in mathematics, whether male or female. Diversity in age, geographic origin, topics of research also played an important role in their selection, which does not claim to be based on purely objective criteria. Subjectivity is an essential ingredient in this exhibition which puts the subject in the foreground with the thirteen portraits by the professional photographer **Noel Matoff**, who unfortunately was not able to accompany me today. The photograph which dominates the panel, is complemented by some

biographical data, a short list of topics of research, a few excerpts from the interviews you will find in the catalogue and the portrayed mathematician's "favourite formula," which might or might not be her own formula. Although essential, the formula is only one component of a compound, the photograph being the most immediately visible part of the panel. The richness of the interviews confirms the fact that their mathematical production is very tightly linked to their biography and reveals the complexity of the ties between the two; mathematicians can definitely not be reduced to the formulas they produce! **Alice Fialowski** from Budapest reports: *After my graduate studies, I wanted to study representation theory, a subject which was not offered in Budapest. With that in mind I decided to go to Moscow for three years as an aspirant (postgraduate studies) to learn from Professor Kirillov. I was admitted and very much looking forward to attending his courses. Once in Moscow, even though I had studied Russian in school for years (it was a compulsory subject), it took some time before I dared open my mouth. At that time, mathematicians in the Soviet Union could not invite foreign students freely. Professor Kirillov was not a party member and when asked why he invited me, he was unable to answer. When I was asked why I had come, I replied I had been motivated by Kirillov's book. I had to ask for the help of the Hungarian Embassy, and managed to stay, but was assigned a second adviser who was a party member.*

Concerning a later period of her mathematical life here in Bonn **Alice** writes: *Once back in Budapest, my first trip to the West was to Oberwolfach, followed by a five month stay in Geneva, at the invitation of Professor Haefliger. He and his nice family helped me to get adjusted to the West. This is where I wrote my first paper in English (the first ones appeared in Russian). After that I went to Bonn as a Humboldt Fellow, where Professor Hirzebruch was my supervisor. I met his whole family, children and grandchildren. The Hirzebruch family was very supportive, particularly at a difficult time, when my father died.*

Mathematicians are subjects producing objective knowledge, in a constant tug of war between the objectivity required for mathematics and the subjectivity inherent to the person producing the mathematical concepts. This tension can become more acute for women, who, in their daily activity as mathematicians, are often brought back to their

womanhood and hence their subjectivity. The tug of war can become really tough when children are pulling at the other end. Let us listen to **Frances Kirwan** from Oxford: *All in all, I had six to seven years with very small children; during this time my teaching duties took higher priority than my research. The first time I got an invitation to speak at the ICM, the Congress (in Japan) was to be when I would have two children under the age of two, so I turned down the invitation, unable to envisage travelling all the way to Japan in such circumstances.*
**Margarida Mendes Lopes** from Lisbon confirms the difficulty in combining career and family: *I have to admit that I was about to give up doing mathematics when, as a mother of young children, I was trying to finish my thesis, which finally took me 8 years to write up. At that time, I could not dedicate enough time to my work and felt rather isolated in Lisbon before the era of internet and Skype. These are some of the reasons why I started publishing rather late in my career.*

As part of a minority in the male dominated mathematical community, female mathematicians are immediately visible as women but often still remain unseen as mathematicians.
**Barbara Nelli** from l'Aquila, is particularly proud of having been noticed for her mathematical achievement independently of her sex: *A personal achievement I vividly recall is something that happened while I was in France for my PhD. I had come to work with Harrold Rosenberg, and had told him so when I first met him. During one of the classes I took with him, he asked me to solve the following problem: "Show that the solution of a positive Gauss curvature equation on a punctured disc extends continuously to the disc", which I indeed solved. This, I think, was what triggered his decision to supervise my PhD thesis. Long after my PhD he told me I had been the first female PhD student he had had.*

This exhibition aims at making the portrayed women visible as "**women of mathematics"**, an expression chosen to avoid the ugly and incorrect expression "women mathematicians" built from a concatenation of two nouns. More often does one come across the expression "Men of science" than "Women of science"; may the title of this exhibition serve as an echo to the famous book published in 1937 by Scottish-born

American mathematician and science fiction writer E.T. Bell "Men of mathematics*:* The Lives and Achievements of the Great Mathematicians from Zeno to Poincare" . Long live the exhibition which is now making its first steps into an age of maturity.