



Balancing Yin and Yang in the field of Mathematics: Interview with Prof. Chenchang Zhu

- Going back to your school days, what or who drew you initially to mathematics?

I would say when I changed elementary schools. I was around 10 years old, I remember I was not such a popular kid, I ranked around the middle of the class. Then, there was a math's test and somehow I got a perfect score, I don't know how! A woman teacher then came up to me and explained that she held a small class specially for the kids who had very high scores and invited me to join the class. In those classes we did some exercises together, I found those small classes and the people very nice, they were very intelligent. I was certainly very happy to attend this class, especially as it was a new school for me. That was how this whole thing started and then I began to participate in the Mathematical Olympiad in this small group.

Afterwards, it was kind of by chance. When I was in high school my favourite rock singer Wong Ka Kui died in Hong Kong, I think he died June 30th 1993. I was really sad and at that time you couldn't go to Hong Kong from the mainland but I knew that the International Mathematical Olympiad was going to take place in Hong Kong in 1994 and I was determined to go there. I've never worked so hard in my life. I remember it was around 40

degrees outside and I would still get up at 8:00 am and work until 10:00 pm. I actually managed to finish all the high school math textbooks in one summer break!

Although in these small classes there were mostly boys, I was not affected by this. The boys were quite nice to the few girls in the class. Also, I feel that compared to other peers who say that when they were younger they sometimes felt a gender bias coming from boys and even from the teachers, in my case it was different. It is probably because in China, at least in my generation, the one child policy meant that in my family I was like "the little princess", and I never felt second best. I would say that for that generation of girls in China, we felt very much equal to boys. I did not care so much about this.

- Did you have any women role models who inspired your career?

I went to the WAM (Women And Mathematics) in IAS Princeton. It is very similar to the recent SwissMAP women's conference, only it was more aimed at students. It was hosted by Karen Uhlenbeck, who by the way, recently became the first woman to receive the Abel Prize in Mathematics!

I would say that it was Karen who

inspired me during this conference. She really awakened this thing inside of me. Before that, I was just enjoying life and I didn't think too much about my future, then Karen really made me think seriously about what I wanted to do in the future. I could see Karen, this amazing woman professor who was there, who organized panel discussions and other very good women professors, women postdocs, who shared honestly their life, both professional and personal, with us. There were difficulties, but they were manageable and these women all seemed to enjoy what they did! I thought to myself, yes, it is possible to become a woman professor! In fact, I returned to WAM again the following year and I was really thankful to Karen.

- Can you speak about your experience as a woman mathematician, particularly at different stages of your life?

I guess the period of graduate school was a beautiful time for me: to learn to live in a new culture and explore

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life. There was a lot of going on for me, and I was at the moment when I had to figure out what to do in life for the future. Then, the period of being a postdoc, I spent 2 years at ETH Zurich and then another 2 years as a young assistant professor maître de conférences in Grenoble. That time for me was mostly a period when I became independent from my PhD advisor and I began to work with many new collaborators. It was amazing how during that period there was much criticism! I would say it was firstly, due to the fact that I was no longer under the protection of my

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advisor and secondly, because I was not yet fully established. Now I realised that my advisor Alan Weinstein, at the same time, being an outstanding mathematician, has also a very gentle and supportive character. He is incredibly fair towards his students with regards to gender. So, I didn't feel at all being different among his students. Today, I realised that it is not the case in general. I was really lucky to have Alan as my advisor!

- Do you think the criticism was accentuated by the fact you were a woman or, does everybody experience this on the road to professorship?

At that time I didn't think it was particularly because I was a woman. However, now when I look back I think it was half and half. I feel math's

society tends to have more "male culture" compared to other areas, such as art or biology.

- ... and as a young woman professor what challenges have you had to face? Do you feel more pressure or expectations?

As a young woman professor, I have had to defend hard make a sound, to work extra to earn respect and trust in my ability, my proofs, and my insight. With time and patience, I'm happy that some are convinced, but

I'm still continuing on this path.

I believe that the greatest pressure and challenge I face is the balance between career and the family. I also I feel this applies to most women professors.

- Do women need to be much better than men to get to the same place?

When I entered the job market the pro-women movement, as well as the presence of the equal opportunities officers in committees, were already very established. I actually I felt it was quite more balanced compared to the previous generation of women mathematicians. I think it was much tougher for them. On the other hand, as I mentioned above, I do feel, as a woman, sometimes, I need to work extra to convince people to trust me

or take my words, even comparing to male colleagues with the same age.

- Did you ever benefit from mentoring or are there any specific moments when you believe it could have been helpful?

I benefited much from mentoring from Karen Uhlenbeck. During my graduate school years it was unforgettable how Karen encouraged so many women mathematicians. She served as a role model to us. We could see there were women pro-

fessors and how they could also be speakers at ICM, and how they work their path over there concretely!

We also discussed about all the problems we could face and how we could go about them. How to manage family life and a career. I found WAM extremely successful and helpful. They gave advice and we all shared experiences.

- You attended the recent SwissMAP Women at the Intersection of Mathematics and High Energy Physics conference. Could you tell us about the benefits of attending?

In terms of content structure, mathematically speaking, I benefited a lot. It was a rich mixture of a variety of topics. I've never learnt so much. Each section was followed by a half hour topic discussion lead by a top figure in the area, where we were free to ask questions.

Somehow the energy amongst participants was different. For example, when someone is too prominent or aggressive, you don't dare to ask questions, but if someone is more low key and calm then your brain is stimulated to ask questions. You do not feel intimidated or, afraid to ask questions is inappropriate or not welcomed. In my opinion during this



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is something to support and grow something on top of it and Yang is

ference and in terms of giving women visibility and recognition, I think before this conference I did not know most of the participants and now I've met women from both mathematics and physics and we had deep discussions. The atmosphere invited you to exchange ideas.

- The panel discussions were very rich in content and it was great to see participants of different backgrounds interacting. Could you briefly tell us something about the gender equality issues which were raised and were you surprised to learn about any of them?

I think one of the panel discussions

was about candidate profile reading in a committee. I remember someone said "if a profile contains a lot of activities, interactions and collaborations, if it's a man, people tend to think, he's very active and if it's a women they tend to think she's very sociable." This is so true! I was just going through some profiles and I noticed that even I was unconsciously doing so. After noticing this, I went back and restarted, avoiding reading the applicant's name and only reading the profiles. I had to re-educate myself.

- Are there any challenges and possible solutions specifically related to the field of mathematics with regards to gender equality?

I think mathematics is a very classical subject created at a time of a male dominated society. I think the first women mathematicians known to the general public date back to around 100 years ago, whereas the first man goes back to 2000 years ago. So, because of this the challenge is that it has already a lot of Yang energy inside. What is definition of being smart and intelligent in mathematics? What is the definition of being valuable and deep in mathematics? What is definition of a talent and a star in mathematics? Its all, already 99% or 99.9% male based opinions.

If you take biology for example, a more recent science, more women

are present. The subject was there at a moment when the ratio of men and women in education matched more evenly. That I find specific to mathematics, because of this somehow all the definitions of smartness... and also missing early women role models... that is why it is great that Karen won the prize, I was really happy when I found out.

- ... and specifically on the subject of recruitment?

As I've said, maths has a lot of Yang energy in it. Firstly, we need more women, who will automatically bring some other kind of culture. Secondly, we certainly need to have more of these women conferences, like the SwissMAP conference or what Karen had in the US, and also summer schools for young women mathematicians. I also think it is important not to let mathematics change us, but precisely we need to stand up for ourselves and bring something new to the mathematics culture, to have more of a balance. I think that it is good to have a balance of both energies. When you have energy balance you can progress more efficiently.

- What advice would you give young women considering a career as researchers in mathematics?

I think first one would need to make sure it's something that you really like. Follow your heart but that is

probably advice for both men and women. Secondly, to be persistent, to stick to it. I would say before you become established you will meet a lot of criticism and you need to be aware that you are likely to encounter it. Women sometimes tend to leave if they think "I am not so good with this" and how do we judge if we are good at this? Often through feedback from outside. This outside feedback plays a major role - that's unavoidable.

I would say to women mathematicians and young women especially, that one needs to stick at it a bit more. It's totally normal for someone to receive criticism early in their career - especially when you are a woman. Try to digest this criticism and don't give up because of it. Be more sure about yourself and try to find support within the community.

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conference people discussed with an opened mind. It was different to attending other types of high profile conferences.

As I said in the panel discussion during the conference, you need to have the balance of Yin and Yang. Yin

this constructive prominent energy also in the direction of competitiveness. Even the male participants in the conference felt much more open to ask questions - it changed the energy field.

On the networking side of the con-



Credit: Mayra Lirot

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