

Interview with Wendelin Werner

“I wonder if it will change the way students will listen in my lectures”

This 38 year-old German-born Frenchman is professor of mathematics at the University of Paris and at the École Normale Supérieure, also in Paris. His work on the calculation of probabilities and bi-dimensional structures has been particularly important in the field of physics. So far in his career he has been awarded the Rollo Davidson Prize (1998), the European Mathematical Society Prize for young researchers (2000), and the Fermat (2001), Jacques Herbrand (2003), Loève (2005) and Pólya (2006) Prizes.

How do you feel, being the winner of a Fields Medal? How were you told and what did you do at that moment?

On a sunny day in May, I did get an email from John Ball, the president of the IMU, asking me to call him back concerning a “confidential matter” (he tried to call me while I was on my way to my office – that day it was the office at the École Normale in Paris). I sort of guessed what it was about, even if I was really not expecting this to happen. I called him but his secretary told me that he was just fetching a cup of coffee and that I should try again five minutes later. When I called again, John Ball told me that he has “good news” for me. I remember his phrase “you’ve won a Fields medal”.

My first thought after hanging up the phone was that this prize was for my work, and since a lot of this work was done in collaboration with Greg Lawler and Oded Schramm, that this medal was also theirs (even if I am the only one under the age limit). Then, I went for a short walk in the “Jardin du Luxembourg” and called my wife, who was the only one that I was allowed to share the news with. One of the strange things was to keep this secret (this had been requested by John Ball) and to discuss with colleagues and friends in the corridor as if nothing had happened.

You are the first probabilist to receive a Field medal. How do you feel about this?

Well, I am very happy that probability theory gets this recognition. Maybe this is a symptom of a change of the perception and influence of probabilistic ideas in mathematics in general. Of course, I feel rather strange to be the first probabilist to receive this medal, given all the history and past accomplishments in the field.

But I should add that this division and classification of mathematics into subfields should not be taken too seriously. New insight often occurs precisely when ideas from different fields are combined. This is in fact to a certain extent what has happened in problems that I have been working on, where complex analysis turned out to be instrumental.

Can you explain in simple terms a problem you work on?

Take scissors and cut completely at random a shape in a piece of paper. What can you say about this shape? Part of the question is to make sense of notion “completely at random” because there are infinitely many possibilities.

One motivation to study this type of question comes from physics: If you consider a physical system and raise its temperature, then at certain values of the temperature, there occurs sudden change of its macroscopic behaviour: Liquid becomes vapour, iron loses its spontaneous magnetisation etc. It has been observed empirically that when a system is exactly at such a “critical” temperature, it can exhibit random macroscopic features. For instance, if the system is planar, then the two phases may coexist and the lines separating the regions corresponding to each of the phases are then random loops, just as those cut out by scissors.

So, physicists had been working on the same questions?

Physicists had been successful in inventing techniques and theories that allowed them to describe many aspects of such two-dimensional critical systems. Key-words can be Conformal Field Theory, Quantum Gravity, Coulomb Gas... But in the eyes of a mathematician, it was very unclear how to relate these tools and formulas to the actual models that were studied. One aspect of our work has been to develop new mathematical concepts and ideas that allowed to get some new insight and to prove the physicists’ predictions.

Will this prize influence your future work in any sense?

It is hard to predict. I understand that the prize is for past work but also an encouragement for the future. So, it looks like a big responsibility for me and maybe a little bit of pressure to deliver nice things. I may want to tackle too difficult problems and end up being stuck... I also wonder if it will change the way students will listen in my lectures. Well, we’ll see. For now, I will first enjoy this moment with colleagues, friends and family.