

## Interview with Andrei Okounkov

### **“I try hard to learn to see the world the way physicists do”**

Born in Moscow in 1969, he obtained his doctorate in his native city. He is currently professor of Representation Theory at Princeton University (New Jersey). His work has led to applications in a variety of fields in both mathematics and physics. Thanks to this versatility, Okounkov was chosen as a researcher for the Sloan (2000) and Packard (2001) Foundations, and in 2004 he was awarded the prestigious European Mathematical Society Prize.

**This might be a very standard question, but making it is mandatory for us: How do you feel, being the winner of a Fields Medal? How were you told and what did you do at that moment?**

Out of a whole spectrum of thoughts that I had in the time since receiving the phone call from the President of the IMU, two are especially recurrent. First, this is a great honour and it means a great responsibility. At times, I feel overwhelmed by both. Second, I can't wait to share this recognition with my friends and collaborators. Mathematics is both a personal and collective endeavour: while ideas are born in individual heads, the exchange of ideas is just as important for progress. I was very fortunate to work with many brilliant mathematician who also became my close personal friends. This is our joint success.

**Your work, as far as I understand, connects several areas of mathematics. Why is this important? When this connections arise, are they a surprise, or you suspect them somehow?**

Any mathematical proof should involve a new ingredient, something which was not already present in the statement of the problem. Otherwise, it would be something obvious or something routine. Most of the time, one doesn't need to search very far, but occasionally an idea from a totally different area of math is indeed required, like an exotic spice. It makes me always very happy when this happens, makes the proof more aesthetically satisfying.

**Physics has benefit a lot from your work. Do you need to know a lot of physics, and work closely with physicists, or you mostly “blindly” devote yourself to mathematics and then physicists come upon and apply your work to their research?**

Definitely, my work benefited a lot from physics. I am not sure about any benefits in the other direction; in any case, this is not for me to judge. No, I don't interact with physicists with my eyes closed, I try hard to learn to see the world the way they see it. While the success rate is not 100%, the inspiration that I get from physics is very important. Mathematics and theoretical physics stem from the same root and their sometimes

complicated relationship is often discussed. But one thing is clear to me: physics gives us beautiful mathematical problems and even some hints how to solve them.

**How is research in mathematics in Russia nowadays?**

I consider myself very fortunate to be a product of the Moscow mathematical tradition and I keep close ties with many Russian mathematicians. It is hard to summarize the state of the research in all of Russia in a few sentences. But it is easy to summarize my hopes for the future: I hope that Moscow, Sankt-Petersburg, and other centres of mathematics in Russia will be as productive in the new century as they were in the 20th century.

**What about the future? Will this prize change the direction of your research in any sense?**

Mathematics is full of open problems, and my area is no exception. We live in exciting times when we are beginning to get a handle on some of them. So the outlook for the future is anything but boring.