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Interview Abel Prize laureate 2019 Karen Uhlenbeck

Supporting the minorities in mathematics

On 21 May 2019 Karen Uhlenbeck received the Abel Prize in Oslo. At the public reception directly after the award ceremony she was interviewed by Ionica Smeets.

In your acceptance speech you gave a very nice overview of your career but you did not say anything about your plans. The Abel Prize is not only an enormous honour, it is also a six million kroner prize.

“It is a lot of money and I have not really thought about it yet, but it did not take me long to decide what to do with half of it. I am giving that to two organizations for under-represented minorities in mathematics. I am giving one million kroner to the Institute for Advanced Study and two million to the EDGE foundation. Many people know what the Institute for Advanced Study is. The EDGE foundation has been educating women going to graduate school. It is run from Bryn Mawr and Spelman College. Many of their graduates now have PhD’s in mathematics.”

In your acceptance speech you also said that you did not want to change the world when you were young, but now it seems that you do want to change the world a bit.

“I am doing this on behalf of everybody who stood outside and looked into the world of mathematics, wanting to be there but thinking that there was no way they could ever make it. An awful lot of people have been in that position and this is in memory of them.”

You grew up after World War II in what you describe as a rather optimistic time. Was it self-evident that you could go to university?

“Yes. My parents both were first generation in their families to go to university and it was expected that we all went to college, and we did. They certainly had more ambitions for my brother than they had for me,

but a part of that story is that I got to play with all his toys: Lincoln logs and building materials.”

You were gripped by mathematics rather late. You did not grow up dreaming about abstract things.

“No, not at all. Actually, most young children do not know what mathematics is. You know what arithmetic is and what plane geometry is. You may know some calculus, but you do not have any comprehension of what the thought behind it is. I was actually enamoured by astronomy and always liked to talk about the books on astrophysics by Fred Hoyle. My father took them out of the library and we both read them. So I wanted to do astronomy or physics, marvelling at the universe.”

I understood that you never really liked lab work and all these practical things that you have to do in physics.

“Thinking back in all honesty, the problem with lab work was always your partners. Somehow I never really had a good lab partner.”

That is interesting, because I think you wrote in an essay that you picked mathematics because you could work alone.

“Yes, that’s correct.”

But if you look at your career, you have been involved in some very successful collaborations, where you found someone from a slightly different field and did something new. Are mathematicians better partners?

“I picked them wisely, or something like that. When I started out I was very much

someone that worked alone. I also taught myself a fair amount of mathematics, rather than from courses or lectures, but slowly throughout the years I have come to rely on doing mathematics with other people. The problem with doing mathematics is that you not only have to think about it, you also have to write it up. After you have gotten a great insight, then what do you do? Well, I have a tendency to wander off, but if you have somebody to work with, then you actually stick to it.”

You have been a pioneer in many fields and this probably is due to that tendency, right?

“It is certainly true that I did not pursue many of the ideas that I had in mathematics, but I wandered off and looked for something else to do. I do not particularly recommend that to a young mathematician.”

Part of being an Abel laureate is being a role model. Your role model when you were younger was Julia Child. She was a cook and a TV presenter. How did she become your role model?

“A lot of people watched her show. She was six foot two, enthusiastic, articulate. She had a big fan club and a lot of people my age watched her. She was successful despite being a lot of things that you were not supposed to be.”

You describe that at some point you were looking to see where all the other women behind you were.

“That’s right. A lot of people really thought that once the legal barriers were down and the programs were open to everybody, women and minorities would walk in through the open doors. At some point we noticed that this simply was not happening. It is now generally known that this



Photo: abelprize.no

Karen Uhlenbeck

phenomenon is not magical. People do not necessarily get ahead because there are no laws preventing them from getting ahead. When I was secure in my own career, it was partly my friend and collaborator Chuu-Lian Terng who made me realize. She said 'I am the last woman hired by my department and I have been there almost twenty years.' It was something that we noticed in the beginning of the nineties. By then I had money, power, prestige and all I really needed. The Institute of Advanced Studies offered us secretarial help, space, their name. It was something you just don't turn down even if you know nothing about what you are doing."

So that is when you started to co-host in their mentoring program.
"That's right."

In your speech you mention that it is not only for women, but also for minorities.
"The program is for women. I have to say that in the seventies and eighties women were really on the outside. The number of

women has increased in the United States to the point that in many places there are a comfortable number of women, but this is certainly not true for the African American community."

How do you work in mathematics? Does this differ from the way that other mathematicians work?

"I know a lot of people who sit down, do calculations, and keep notes. Keep a notebook of all their ideas and so forth. My habit is to write down from the beginning everything I know about the problem. After many days or weeks or months of not getting anywhere, I would stop. I used to use all the papers that I worked on. I would come back saying to myself to really give that problem another try. Then I start from the beginning again and try to see it from a different point of view."

How much time did you spend on these ideas?

"I do not really like to think about that (laughs)."

Well, there have been enough that succeeded!

"In fact, one does feel badly about it, because lots of times you actually tried very hard for a long time and you don't think an idea works. When you see other people trying the same idea again and not having it work, you feel that maybe you should have told someone that this does not work."

And how would you feel if someone else did make it work, would you be happy?

"I would go (hits her head). In fact, that happened to me recently and I thought: Oh my god. Why didn't I do that?"

Well, maybe you were already working on something else. This Thursday you are going to be playing mathematical games with school kids. Do you like this, playing games with younger students?

"Actually, I don't do it much. It will be a good experience for me."

Will you beat them?

"That's a good question. I will try not to. I am not much of a game player. I was a very ambitious child and I have the kind of mind that really grabs on to a problem and does it. I was very good at games and people did not like it when I won all the time. I found that with games you feel bad if you lose and other people hate it when you win. I tend to back off from doing games. I like solitaire."

A final question. You have said in the past that you felt rather uncomfortable with the prestige and the prizes you got. How are you processing winning the Abel Prize?

"I am just walking through it doing what people tell me to do. It is like a whole lot of different jobs. What are you going to do with the money? How are you going to get to Europe? What are you going to wear? All these things. I really have to say that one thing that I am much better at than ever before, at this age and with this experience, is asking for help. It makes life so much easier. If you are lost, don't keep looking for where it is, ask somebody."

So that is your advice: don't jump from problem to problem and ask for help?

"Ask for help as often as you can." ☞

A video of this interview can be watched at: youtu.be/mmWdPPwSi64.