



PROFILES OF WOMEN SCIENTISTS IN ASIA

Their inspirational stories

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RUSSIA

SIBERIA

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Biography

I was born in Kyrgyzstan in a family of seven children. I graduated from Novosibirsk State University in 1981, defended my PhD thesis in 1985, habilitation in 1998 and became a professor in 2002. Since 2012 I have been the director of NN Vorozhtsov Novosibirsk Institute of Organic Chemistry and the institute's head of the Department of Physical Organic Chemistry. I specialise in physical chemistry, the development and application of new magnetic resonance methods for the study of mechanisms of chemical reactions. I have authored more than 170 scientific articles, six monograph chapters and more than 400 abstracts at international conferences. I am member, vice president and president of various expert societies in my field, expert of the Russian Science Foundation and the Russian Federal Property Fund and an awardee of the Japan Society for the Promotion of Science Fellowship. Fifteen PhD theses and more than 25 student diplomas were defended under my leadership.

When did you know you wanted to pursue a career in science?

I have loved physics and mathematics since I was young. When I was in middle school I took a distance learning course provided by Novosibirsk State University, as they provided such courses for motivated youth. I was deeply interested in physics and I enrolled at Novosibirsk State University, majoring in chemical physics. Over time my research topics have shifted, but I believe in the basic joy of being a scientist, that is, to have the possibility to discover something new or to find something that nobody has found before, which is such an exciting challenge.

Who or what inspired your passion and curiosity in science?

I had very good physics and mathematics teachers at school. In addition to school lessons we had tutorials for children who were interested in special subjects, called electives. It was very interesting to build my knowledge and read additional journals and books on physics and chemistry. There was a special journal for children, *Quant*, that published very interesting articles about achievements in physical and mathematical science. In the USSR we also have special competitions for pupils in different subjects. I always participated in these competitions and was lucky to be win several times, not only in our local region but also in the capital of Kyrgyzstan.

Who were the influencing role models in your career and how did they inspire and motivate your passion to pursue a career in science?

Most of the professors teaching at Novosibirsk State University are well-known scientists in different fields who combine their university teaching work with research work in the institutes of Russian Academy of Sciences. In the Voevodsky Institute of Chemical Kinetics and Combustion there were several great scientists who contributed a lot to physical chemistry. I was lucky to work on the field of spin chemistry with Professor Renad Sagdeev and Professor Yuri Molin. My knowledge of engineering came from Dr Yuri Grishin. with whom we created several new experimental setups. I collaborate with many scientists all over the world, and several of them are great scientists like Professor Robert Kaptein,

Professor Bargon, Professor Klaus Morbius and Professor Yamauchi.

What do you think is your greatest scientific achievement to date?

The most interesting results are developments of several highly sensitive new techniques for the detection of short-lived radical pairs in solution. One of these methods is based on electron paramagnetic resonance and nuclear magnetic resonance and is called 'stimulated nuclear polarisation'. Another is the observation for the first time of electron-nuclear spin polarisation and our investigation of electron spin relaxation in very low and zero magnetic fields. Recently, we showed for the first time that it is possible to measure nanometre distances in biomolecules at room temperature using pulse dipole electron spin resonance (previously all experiments were performed at nitrogen and helium temperatures). I very much like our results showing that radical-controlled polymerisation can be ruled out using protonation and complexation with metals. It allows for obtaining materials with interesting properties.

What motivates you to work as a scientist in Asia?

I was born in Central Asia (Kyrgyzstan) and then I moved studied in Novosibirsk State University in Akademgorodok, a world-known scientific centre. We have good infrastructure for science and technology and a university of a very high level. The scientific level of Siberian Branch of the Russian Academy of Sciences (which belongs to Asia) is very high and very attractive to scientists all over the world. I should say that our institute has very diverse international cooperation with the US, Germany, Switzerland, Poland, France, Japan, China and others, funded by many countries—Russia, the US, Japan, the European Union, etc.

What are some of the challenges you have faced as a female scientist and how have you overcome these challenges?

The main challenge is how to combine family and a scientific career. I have two children and five grandchildren. My husband is a professor in plasma physics and heads a laboratory in the Budker Institute of Nuclear Physics. I am very happy that my husband understands me and that we share all duties at home and care about our children. When I had my first daughter in the last year of my PhD, it was hard to find a PhD position. Finally, I got on and defended my PhD after three and a half years. Until last year I was the only female director of a scientific institute in the Siberian Branch of the Russian Academy of Sciences. I feel there is a difference between me and male directors in our relations with officers of the Academy, but after several years of successful work in this position most of my colleagues are used to me and have respect for me.

What are your future aspirations related to science? What further barriers do you foresee to reach those goals?

It is a great enjoyment to do scientific work. During the past few years I have started several new projects investigating biopolymers in cooperation with biologists. These are very exciting and

need a lot of time. At the same time, I have to do a lot of administration, which also takes a lot of time, so I work on weekends and nights trying to combine both my duties as Director and scientist.

What would you say to young women considering a career in science?

Science is great and very exciting, and a very enjoyable profession. Every day you can discover something new and you can learn something about nature that nobody knew before. If you are a careful and motivated worker, you will have a chance to be lucky enough to discover something that could change the life of humanity (like the internet, cell phones, aeroplanes and so on). Believe in yourself and be a hard worker. Open your eyes wider—try to find the hottest scientific field most interesting for you.

What is your opinion on the state of gender equity in science? In your country, what do you think is needed to address this urgent issue? What is the role of learned academies or professional bodies at local, regional and international levels to support a future of gender equality? Are you involved in any events or organisations related to 'Women in Science and Engineering'?

Gender equity in science has been better in the past few years but is it far from ideal. There are many reasons for that; partly it is determined by nature and traditions—women are responsible for giving birth and taking care of daily life. In Russia the situation is quite good, in chemistry and biology there is nearly equity in students and postdocs, but later

male scientists advance much faster in their scientific career. In mathematics and physics the number of male students and postdocs are significantly higher than females, probably because these fields of science are traditionally a male in Russia.

I am the leader of Federal Organization of Graduate Women of Novosibirsk Region (www.fuwr-nsk.ru), which was established in 2016. Our activities are aimed to motivate girls to enter science and to show scientific achievements successful women in science. We organise the festival 'Academina', where each year such women of Novosibirsk are selected and awarded special prices. We also organise meetings where successful women and phycologists discuss the problem of how to combine scientific work and family. I also take part in an ICSU Gender Gap in Science project 'A global approach to the gender gap in mathematical, computing, and natural sciences: how to measure it, how to reduce it?'. It is very important to take part in this project and reply to the questions on the website: https://statisticalresearchcenter.aip.org/cgi-bin/global18.pl