



Prof. Rajinder Jeet Hans-Gill

(Born 29.08.1943)

A mathematician driven by passion



Life of Professor Rajinder Jeet Hans-Gill, an eminent mathematician who had to dress up as a boy to attend school is one of the most inspiring stories of women in STEM one can come across. Her doctor father Gursheer Singh Hans was transferred to different rural areas of Punjab. So she had to spend her childhood in small villages of Ludhiana district. Her mother Gurdeep Kaur continued learning privately after marriage and believed in women's education.

When Rajinder saw her elder brothers going to school, she curiously began reading their second standard Urdu books, writing Urdu script and was also learning addition and multiplication tables. There was only a boys' school up to Class 4 situated about a mile away. As girls were not permitted, the first

few years of her life were spent studying at home, longing to go to school. Seeing her keen interest, her father requested the headmaster for admission. Though he refused to formally enrol her, he allowed little Rajinder to come and sit in the class with her brothers. "I had the blessings of my grandfather who had called me Vidya noticing my inclination towards learning at an early age. I would daydream that I would do something great when the right opportunity arose. It bothered me that I was a girl and I made up for this by speaking like a boy and dressing up like my brothers", she quips.

When transferred to Isru, the family found a primary school for girls housed in a *dharamshala* (like a community-centre) that had only one room in which all the five primary classes were held.

As she was already proficient in arithmetic and Punjabi, her father convinced the headmistress to admit the six-year-old girl in Class 5. She "didn't enjoy this school at all. The atmosphere wasn't stimulating. There were no books to read." In the final examination they were supposed to do some cooking and washing. Her grown up classmates had no problem with these. The teacher was kind enough to just pass her in these subjects. Despite these challenges and the absence of a middle school for girls, she continued learning at school and from her brothers at home. Her father taught her English and geometry.

Her brother Bhupinder passed Class 4 exam and won a scholarship. He was sent to their uncle's house at Garhshankar, while their uncle's son was staying with her family

in Isru. There was a teacher from Isru teaching at Garshankar, with whom her brother would come home or cousin would go to visit his parents.

Rajinder's uncle refused to host her, as he believed that girls need not be educated. But time changes people! A few months later, the school teacher was going back to Garshankar from Isru and the uncle had asked his son to come back with the teacher. Knowing her uncle's good heart, Rajinder's father hit upon an idea and told her, "Well, if you go there, I think he will not send you back home. If you want, you can go with the teacher and your cousin." This chirpy girl jumped at the opportunity, packed her bag and reached Garshankar with her cousin. Uncle and aunt were shocked to see her initially. But after a couple of days, seeing her enthusiasm to learn, her uncle agreed, "Okay, I'll find out if you can be admitted to the Arya School for boys. If you get dressed like a boy, you could go. He gave strict instructions that I should henceforth be addressed and dressed as a boy." Rajinder was trained for tying a turban and went to boys'



school with her brothers. She was provisionally admitted to Class 7 and was addressed as Rajinder Jeet instead of Rajinder Jeet Kaur. Every day, she attended school as a boy for the next six months, till fate made her change school soon.

When she found maths and history tough, her brothers helped her. Later, in her undergraduation too, her brothers helped her cope with new subjects, as she was mostly self-taught and took the unconventional path of learning! "Just going to school was very satisfying for me, even though I had missed many normal activities of that age. It was fun at home since I got some privileges sporting as a boy, which my uncle's two daughters did not have."

The best part is even at that age, she took life as it came with the attitude of a *jnani*! Her uncle got transferred to Hoshiarpur, where he got her admission to class 8 at a Khalsa school for girls. With her passion for learning and hardwork, she became a teachers' pet. She spent only a few months and had to soon move out, as the scene at home changed once again!

Rajinder's father got transferred to Gujjarwal where there was a girls' school. But this new school had no teaching in Class 8. There were no desks and one had to sit on the floor. In Class 9 and Class 10 they did not teach mathematics; only arithmetic as one subject and household as another. There was no science teaching either.

Knowing the intelligence of his daughter, her father asked the headmistress if she could introduce the mathematics paper. But she was not in favour of it, as she felt that maths was a difficult subject for girls! In the final exam of Class 9, Rajinder, got full marks

in arithmetic while in household it was the opposite. "Don't worry! You will not do household!" said the encouraging father and advised her to learn algebra and geometry during the summer vacation and he tutored her. Rajinder wanted to do something really practical which is useful to humanity, becoming a doctor like her father. Well, life has its own plans!!

After the vacation, Rajinder's father contacted the headmaster in the boys school to allow her to write Maths and Science exams, so her dream to become a doctor would come true. "Well if you need a certificate for maths, we'll give it. But for science, there are practicals. You will have to send her for practicals," was the reply they got.

"My father was sort of doubtful. He didn't want me to do medicine because he thought it's a very hard life for a doctor. Also I was rather young at that time. One had to be above 18 to be admitted to a medical college after the intermediate. He was of the opinion that I would have completed my MA by that time and be teaching already. It seemed logical, and we decided that I will take up maths in Class 10. So for one year I studied maths at home. I liked maths. I liked science too but I really didn't get the opportunity to study it. I wanted to do something really practical which is useful to humanity. That is how I came to maths, and it worked out alright," says Rajinder on her entry into the field of mathematics.

Rajinder later got admission in the Government College for Women at Ludhiana, topped in the university with three medals, standing first in Panjab University in B.A.

"I don't quite remember the textbooks. I was much interested



as the youngest scholar of the Ohio State University. At OSU, great minds like Prof. Hans Zassenhaus and Prof. A.C. Woods made a remarkable impact in her journey. She was appointed at University of Wisconsin, Madison for three years with the possibility of extension. After working there for a year, she came back to India on one year leave with the thought of going back.

Life again took a different turn and she stayed back! She had an offer from the Tata Institute of Fundamental Research (TIFR). But then as she had been away from home for almost three years and as she wanted to be near her family, she joined Panjab University. In 1968, her parents arranged her marriage with Prof. Jagjit Singh Gill, who was then working at

the Indian Agricultural Research Institute in Delhi. She had to face what is famously known as two body problem, meaning husband and wife both working and living in different cities. When their children were small, Rajinder sought support from her parents and in-laws. "I was very conscious of the fact that one should not let domestic issues affect the department work. If a woman is lax about her job, it is noticed more. It seemed to me that it is the reputation of women that is at stake, so I tried to take up these responsibilities very seriously. My husband was very supportive and always encouraged me to attend to my official duties on priority."

At University, she was also involved in the College Science Improvement Programme (COSIP), authoring textbooks, training teachers and guiding students. She also served as the Dean and University instructor at Panjab University, Chandigarh during 2002-04. Owing to her brilliant research work, she was made Professor Emeritus in 2007 and senior scientist at Indian National Science Academy in 2009. She was a visiting professor at OSU during 1986-88.

Dr Rajinder Jeet Hans has made valuable research contributions in the field of geometry of numbers, discrete geometry, Diophantine approximations, view obstruction problems and billiard ball motion problems. Her innovative idea of proving Watson's conjecture on the non-homogeneous minima of quadratic forms is world renowned. There exists a conjecture bearing her name as Bambah, Dumir and Hans-Gill conjecture.

Highlights

- ▶ Srinivasa Ramanujan Birth Centenary Gold Medal, ISCA, 2010.
- ▶ Co-authored Lectures on Geometry of Numbers with her young colleagues Madhu Raka and Ranjeet Sehmi.
- ▶ Fellow of Indian Academy of Sciences and National Academy of Sciences.
- ▶ Council Member and Vice President of Indian National Science Academy.
- ▶ Fellow of the Third World Academy of Sciences, Italy.
- ▶ Member of National Board for Higher Mathematics (2003-06) and 'WiS' (Women in Science) project of the Indian Academy of Sciences.

"What I feel is that generally one has to make a decision at some stage about what one wants to do. There are so many directions these days, you may become an engineer, computer engineer, artificial intelligence expert or a doctor. There are so many attractions and the parents may also be putting some pressure. There are more opportunities now than before; ... Maybe there is more competition also but the joy of research, you know, and solving a problem is unmatched," she avers.

