

The Monk Who is Sold on Geometry: An Interview with Mahan Maharaj



Professor Mahan Mj is a young geometric topologist at Ramakrishna Mission Vivekananda University, who combines an esoteric career as a research mathematician and teacher with that of a monk. He belongs to the monastic order, Ramakrishna Mission, founded in 1897 by Swami Vivekananda, a renowned Hindu philosopher. He is currently a Professor in the Department of Mathematics, Ramakrishna Mission Vivekananda University, whose campus is located just outside Belur Math, the Headquarters of the Mission in Kolkata, India. Mahan Mj was recently awarded the Shanti Swarup Bhatnagar Award in the Mathematical Sciences, India's topmost national award that recognises scientific contributions made by Indian scientists under the age of 45. Initially reluctant to be interviewed, saying that he believed in the "anonymity that a mathematician's career affords", Mahan Mj graciously relented and spoke to Sujatha Ramdorai.

Sujatha Ramdorai (SR): Please tell us a little about your background and early education.

Mahan Mj (MM): My early schooling was at St Xavier's College, Kolkata and then I did an Integrated MSc (Maths) degree at IIT Kanpur.

SR: When did it become clear to you that a career in Mathematics was what you preferred?

MM: It's the subject I liked most at school. Nevertheless, due presumably to social conditioning, I opted to join the BTech programme at IIT Kanpur in Electrical Engineering for the "security" it would provide. This was, however, with the intention of switching to Maths after the BTech. I expressed the intention of returning to Kolkata and joining ISI (Indian Statistical Institute) Kolkata BStat, a few months into the programme as I didn't quite enjoy Engineering studies. But many people tried to convince me that this was not a good option and I was temporarily convinced. One of the principal reasons given was that there is a lot of Mathematics in Electrical Engineering. However, the flavour of Mathematics in Electrical Engineering, or any other Engineering discipline for that matter, is quite different from the flavour of Pure Maths. I realised this in my 3rd semester when the first Electrical Engineering course was offered. IITK has an option of a branch change, which one usually applies for at the end of the 2nd semester. This is possible, because the coursework across departments is essentially the same for the first two

years. I was fortunately granted a branch change though I had applied a semester late. I suspect that since it was moving from a more sought after department to one that was less sought after in a Technical Institute, the authorities didn't object much.

SR: Can you tell us about some events/personalities that might have influenced your decision to opt for a mathematical career.

MM: I think that the principal reason was that I found the flavour of Engineering as an academic pursuit unsatisfying. Also my batch at IIT Kanpur had a number of very good people in the Pure Sciences, particularly in Physics. Rajesh Gopakumar and T Senthil were two of my friends in Physics with whom I used to "hang out" a lot and I think this did exert some influence. Mathematical personalities came a bit later — after I had changed into maths. Hardy's A Mathematician's Apology has exerted considerable influence philosophically in the sense that it fostered a kind of platonic view of Maths. I think I still subscribe to the view that pure mathematical theorems/facts are about real objects and their interrelationship. This is of course a purely a rational (as opposed to irrational) belief. Also Constance Reid's books on Hilbert and other biographies demonstrated the excitement and romance of Mathematics. All this made me feel that I had made the right decision and that I had entered a world where I belonged.

SR: There are very few mathematicians outside of pure Research Institutes who have been awarded the Shanti Swarup Bhatnagar prize, and you are one of them. Would you like to comment on this?

MM: I think the factual content of your question is itself a comment on the state of higher education in the country, particularly in the Sciences. There is a sharp dichotomy between Teaching Institutions and Research Institutions that prevails in post-independence India. This fact was underlined by the Report of the National Knowledge Commission, of which you were a part. I completely agree with the findings of the NKC in this regard. However, just for the record, I should point out that Kingshook Biswas, a young colleague of mine in the Maths Department at Vivekananda University has been awarded the INSA Young Scientist medal in April 2011.

SR: It is not so usual in India to opt for a career in teaching and research, given the presence and focus of pure Research Institutes. What made you choose a Teaching Institution rather than a pure Research Institution?

MM: This is a follow-up of my answer to the previous question. I think a number of people, especially younger people, who have done their PhDs abroad, particularly Europe and America, have seen that the standard educational institutions there, viz. the best universities, are those that combine teaching and research. This has given rise to an increased awareness in India that for many, if not most, mathematicians, a combination of teaching and research works best. This awareness is demonstrated by many Research Institutes developing teaching programmes. For me personally, teaching is part of a social commitment. In our university, teaching is at the Masters' level. This forces me to re-examine a lot of basic material while teaching. Thus

teaching becomes a learning experience as well. I have found that it affects my research positively. In this, I am not alone, and many mathematicians I've come across have told me the same thing.

SR: Would you like to talk about what attracted you to spirituality and the monastic way of life? When did this happen?

MM: The second part of your question is easier to answer. I decided to become a monk while doing my PhD at Berkeley, very possibly in my 3rd or 4th year. I had started reading some of Vivekananda's writings during my final year of MSc and this continued through my PhD. However, it's very difficult, if not impossible, to sharply delineate what exactly it was that attracted me to this way of life. It certainly was not any kind of theology and I remember being quite strongly atheistic during my MSc. On the other hand, there are certain fundamental values — truth and unselfishness, in particular — which I shall elaborate on in answer to your next question that we as human beings, in general, and scientists, in particular, subscribe to. "Where do these come from?" is a question to which each must give his/her own answers. But trying to act on the basis of these, though not always easy, is inevitably a source of subjective satisfaction. This was, for me, an experimental fact. For me, strictly personally, the monastic way of life provides a lifestyle where it is easier to act on the basis of these values on a day-to-day basis.

SR: Let me be very frank; the world is probably more curious about how you combine your life in a monastic order with that of a scientist/researcher. Mathematics is probably a discipline that easily affords a transition from one to the other... Would you agree? Is there anything on this aspect that you would like to share with us?

MM: This will be an elaboration of some points I've already mentioned. Science and Mathematics as fields of human endeavour are, for me, based on two precepts: 1) It is worthwhile to enquire into the truth of things — abstract or sensory — to ascertain facts that are not dependent on opinion and free from bias. 2) No individual or group of individuals has special right to the benefits of the fruits of such an enquiry. Thus the fruits of scientific discovery should, at least in principle, be available to all. More generally, there is no fundamental difference between individuals. Roughly speaking, research as an activity is based on (1) and teaching on (2). Viewed this way, Science, because it aims at ridding us of dogma, and making its benefits available to all, is fundamentally a non-materialistic endeavour, provided we try to carry these things from our intellectual into our personal lives.

SR: Tell us about the monastic order to which you belong.

MM: The Ramakrishna Mission is a philanthropic, humanitarian and volunteer organisation founded by Ramakrishna's chief disciple Swami Vivekananda. The Mission conducts extensive work in health care, disaster relief, rural management, tribal welfare, elementary and higher education and culture. It uses the combined efforts of several ordered monks and well-wishers.

The Order is non-sectarian and has within its folds, monks from all major world religions: Islam, Christianity, Judaism, Buddhism, Jainism, Hinduism. Freedom to practice as per one's religious convictions is a fundamental tenet we adhere to. If one were to summarise the activities of any member of the Order, it would have to be "Service and Contemplation" in a rather broad sense. In this rather general framework, "Teaching and Research" seem to fit rather well for me.

SR: Please tell us about your mathematical work; the area you work in, how did you get interested in this?

MM: I had decided to work in Topology fairly early. Prof Shobha Madan at IIT Kanpur had taught us a couple of fantastic courses in our 3rd year which sparked off this interest. Then during a visit to TIFR in the summer of 1990 and again in 1991, as a visiting student during my MSc., I had a chance to interact with V Srinivas, Indranil Biswas and, of course, M S Raghunathan. They put me onto Guillemin–Pollack's book on Differential Topology and during my second visit, I studied Milnor–Stasheff's Characteristic Classes with Srinivas. In my final year, I got specifically interested in Low-Dimensional Topology. At Berkeley, there were a number of outstanding mathematicians working in and around the area: Andrew Casson (my advisor), John Stallings, Curt McMullen and, of course, Bill Thurston who was the Director of MSRI during exactly the 5 years I was in graduate school. Grisha Perelman was a postdoc then. Gromov's seminal work on Hyperbolic Groups had recently appeared and I spent a very fruitful semester doing a reading course on it with John Stallings. Thus, the interface of Kleinian Groups, Geometric Group Theory and Geometric Topology became defined as my specific area of work

SR: Your frank impressions that you would want to convey to youngsters seeking an academic career in Mathematics.

MM: The usual: there are no shortcuts. One has to work hard and think hard and let the rest take care of itself.

SR: What next in your mathematical pursuits?

MM: I've broadened out somewhat recently, particularly, as there are very few people in my specific area in India. One problem that has been interesting me in recent times is an old question of Serre's: What groups can appear as fundamental groups of smooth projective varieties? There are also a couple of fundamental advances in 3-manifolds over the last couple of years: 1) Work of Kahn–Markovic, proving the existence of incompressible immersed surfaces in hyperbolic 3-manifolds. 2) Work of Wise on the virtual fibering conjecture. Their solutions carry much promise for further development.

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