

ROLE MODELS FOR MINORITIES IN MATHEMATICS

With a provocative pink title on a black background: Why not? Are you biased by these choices? Do you believe they impact the content of the article?

Mathematics is a very accessible subject, not in the sense that it is easy, but in the sense that anyone can access to it without the need of expensive resources. In theory, a person as talented as Ramanujan would be able to learn mathematics by themselves and be able to contribute to research with original and high-quality results.

In this respect, mathematics is very democratic: there are impressive results proven by high-school students (for example, Daniel Larsen in 2022), there are impressive results proven by not so famous mathematicians (for example, Prof. Yitang Zhang in 2013).

Moreover, nobody really cares whether a result was proven during canonical working hours (Monday to Friday, 8AM to 5PM) or if it is proven during a middle-of-the-night inspired moment. Maybe you got the idea by looking at clouds (Prof. Maria Colombo declared in an interview to watch the evolution of cloud patterns) or maybe you got a key revelation while dreaming. Maybe some parent got the idea while watching their children in the playground, others during a train journey, and so on.

Considering all of the above, why do we insist that the role model of a mathematician is a middle-aged male white person with messy hair and casual clothes, and with a full-time job as a mathematician? Of course a nicely dressed person with red nail polish can prove spectacular theorems on a regular basis. Or even someone who is not a mathematics student nor a mathematical researcher (provided, of course, that sufficient time is devoted to mathematics).

We would all believe that if Prof. Terence Tao would be working in a bank and doing mathematics as their main hobby, then many good theorems would result, probably even surpassing the regular research output of some more canonical mathematicians.

We have to break some common stereotypes.

One misconception that caught my attention recently is probably one reason for which many talented people do not become scientists. In a recent interview for Quanta Magazine, the mathematician Prof. Wei Ho from IAS Princeton was also affected by it during her school time:

“I wanted to do everything, all the time,” Ho said. “I took ballet very seriously until early high school. I edited the literary magazine. I did debate and forensics. I played tennis and soccer and piano and violin.” By contrast, many successful mathematicians appeared to be obsessed with math to the exclusion of everything else. How could she, a person with numerous passions, compete with that level of focus?

The usual stereotype seems to exclude pupils with many talents and interests. But in fact very intelligent people excel in many subjects (so, not only in mathematics) and many doors are open to them. And having many interests in high-school is a sign of a curious mind and a flexible spirit, nothing that speaks against becoming a scientist. Surely for many mathematicians mathematics was by far their favourite subject (but for example the Field Medalist Alessio Figalli was also passionate about Latin and Greek in school).

And many mathematicians had “mathematics” as a hobby: they participated to mathematical circles (if they had the occasion to) or studied mathematics beyond school mathematics, for example by reading popularisation books or by training for mathematical competitions. This is not necessary to have a brilliant mathematical career: high-school is meant to study many subjects and the specialisation is only foreseen at the University.

Educators should also understand the double-edged knife of mathematical competitions: enthusiast and successful participants get a confirmation of their inclination to mathematics, however, to succeed at high level, continuous training efforts over a long period of time are needed. So if you are Ramanujan but you did not train, then you won’t score as spectacularly as your mathematical potential would allow. Moreover, some other talented mathematician would be penalised by unavoidable aspects of mathematical competitions which are: the competitive atmosphere; the individual

work; the time constraint; the type of proposed problems.

As a rule of thumb, several IMO participants become excellent mathematicians but there are also excellent mathematicians who for whatever reason did not participate to IMO and that eventually outperform the other group.

So please remember that mathematical competitions should be valued and encouraged with a grain of salt because in some cases they can discourage rather than encourage.

Moreover, it could be helpful to remind to the sweet little girl who would become the new Prof. Wei Ho, that it is perfectly fine to have many hobbies and not to sacrifice everything to mathematics. Actually, this is true also later in life: you could still be an excellent mathematician while actively parenting four children, or playing a musical instrument at professional level, or by pursuing any hobby beyond the 40 hours work per week.

Let's be inclusive: let's remember that mathematics itself does not put constraints to mathematicians, so let's not be fools and invent such constraints ourselves.