

This hairy hermit could save maths

By Simon Singh

(Filed: 17/08/2006)

[Comment on this story](#) [Read comments](#)

The Russian Grigory Perelman is being called the cleverest and craziest person on the planet. He has come up with the greatest mathematical proof of the 21st century, while sporting the sort of facial hair that makes him look like Rasputin's twin. He has been offered the most prestigious prize in mathematics, but it is unlikely that he will bother to claim it.

The reclusive Perelman is reinforcing the stereotype that mathematical geniuses are strange eccentrics, and he seems to be exactly the sort of person who puts people off maths. At a time when Europe is trying to encourage young people to study maths, why can't our top-notch mathematicians be beautiful, witty extroverts? Why can't they drive around in fast cars and fill the tabloids with gossip about their Hollywood-style orgies?

Realistically, mathematicians are never going to be very glamorous, and moreover it could be that Perelman is exactly what mathematics needs in order to promote itself. Perversely, however, I believe that this hairy Russian hermit could be the poster boy who helps create a new generation of mathematical geniuses. First, it is clear that Perelman is a genius. It is widely accepted among scholars that he has solved the notorious Poincaré conjecture, which had mathematicians baffled for more than a century.

The conjecture is about spheres that live in a higher dimension. Although mathematicians knew how to define a normal three-dimensional sphere, it had been hard to pin down the properties of the fiendishly abstract four-dimensional sphere, until Perelman came along. His proof of the Poincaré conjecture runs to several hundred pages of dense mathematics and is considered a mathematical masterpiece.

In 2000, to add some glitz to number-crunching, the Clay Mathematics Institute in America offered seven Millennium Prizes of \$1 million each for the solutions to seven major problems in mathematics, including the Poincaré conjecture. None of the other problems are close to being solved, so Perelman would be the first to claim \$1 million, but he has shown no interest in becoming a millionaire and spurned any approaches by the prize organisers.

The majority of the population will find this type of behaviour bizarre, and it will serve only to reinforce their antipathy towards mathematics, mathematicians, all numbers bigger than a million and any polygon with more than four sides. Unfortunately, mathematicians are never going to be fun, cuddly folk who appeal to the masses, because what they do is inherently extremely esoteric.

More importantly, however, Perelman might appeal to a small, but critical, audience - namely the tiny fraction of the teenage population who have a talent and enthusiasm for abstract mathematics. They are currently awaiting their exam results and wondering what to do next. Those around them might be saying that studying mathematics could lead to a career as an accountant (which is an important profession) or perhaps to becoming a teacher (an even more important job), but these opportunities are not necessarily going to inspire every mathematically inclined teenager.

In contrast, Perelman shows that studying mathematics can also offer another path. It can lead to a romantic, obsessive lifestyle that is on a par with being a poet or a musician. Perelman spurns money, medals and honours, because the highest reward for him is simply the opportunity to create wonderful mathematics.

Perelman is not unique - the history of maths is full of heroes who exhibit a purity of spirit and utter determination that make mathematics the sexiest discipline on the planet. For example, Sophie Germain had to disguise herself as a man in order to overcome the prejudices of early-19th-century Paris and make discoveries that eluded earlier generations. At roughly the same time, the 20-year-old Evariste Galois knew that he was going to die in a duel and spent his final night writing down all his mathematical ideas. If he was going to die, then he did not want his maths to die with him, and, sure enough, his radical ideas continue to influence modern research.

More recently, Paul Erdős, the most prolific mathematician of the 20th century, shared many of Perelman's traits. He worked for 19 hours a day, fuelled by coffee and amphetamines. Erdős would often say: "A mathematician is a machine for turning coffee into theorems." His entire belongings fitted easily into two battered suitcases, and instead of buying a house, he lodged with fellow mathematicians. His motto was: "Another roof, another proof."

Erdős was not interested in wealth and gave away his money by offering rewards for the solution to various problems. Once, when the outstanding rewards totalled \$15,000, a colleague pointed out that Erdős would be bankrupted if all his problems were solved, to which he replied: "But what would happen to the strongest bank if all the creditors asked for their money back? The bank would surely go broke. And a run on the bank is much more likely than solutions to all my problems."

The last time that mathematics had a hero figure was when Andrew Wiles proved Fermat's last theorem, which required

seven years of secret devotion and a similarly formidable proof. Although Wiles has accepted his prizes, totalling several hundred thousand dollars, his real motivation was mere curiosity and the desire to explore the uncharted regions of the mathematical universe. Wiles, Erdős, Germain, Galois and Perelman all share a desire for knowledge and wonder, as opposed to money and fame.

Next week Perelman will get another chance to show his disdain for baubles and fancy prizes, because it is likely that he will be offered the Fields Medal - the mathematical version of the Nobel Prize. Perelman has already refused to give a lecture at the International Congress of Mathematicians in Madrid, where the medal is to be awarded, which means that he will probably refuse to accept the medal. It will be the ultimate act of defiance, as the Fields Medal can only be awarded to mathematicians aged 40 or less, and Perelman's 40th birthday was earlier this summer.

Simon Singh is a science writer and the author of 'Fermat's Last Theorem'

 [Comment on this story](#)

► [News: Russian to turn down million dollar prize for maths](#)

Information appearing on telegraph.co.uk is the copyright of Telegraph Group Limited and must not be reproduced in any medium without licence. For the full copyright statement see [Copyright](#)