Opinion

Medal Images, Public Domain.

Is the Fields Medal the Nobel Prize of Mathematics?

I have read with great interest the two recent Feature Articles on the Fields Medal [January 2015: "The Myth and the Medal" by Michael J. Barany, and "Is There a Curse of the Fields Medal?" by János Kollár]. The article by Barany, in particular, addresses the very important and timely issue of the comparison between the Fields Medal and the Nobel Prize. Though the article gives an excellent account on how that comparison came to be made in the first place, it leaves open the more important issues of whether the comparison is pertinent at all and whether making it is advantageous to our discipline.

Concerning the first issue, the differences between the Fields Medal and the Nobel Prize can hardly be exaggerated. Whatever the original intentions, the Fields Medal is given only to young mathematicians below the age of forty. To have a chance at the medal a mathematician must not only make a major contribution early on, he/she must also be lucky enough to have its importance broadly recognized before the arbitrary fortieth mark. This means that, if an area of mathematics is not represented in the composition of the Fields committee at a given International Congress, truly original and important contributions in that area have very little chance.

In contrast, the Nobel Prize has no age limits. The role of a Nobel committee (in natural sciences) is, at least in principle, to identify those breakthroughs deemed most important by a broad segment of the scientific community and then decide who are the most deserving contributors to it. In contrast with the Fields Medal, which is given strictly to an individual, independent of whether other people might have contributed important ideas to the cited works, the Nobel Prize can be shared by up to three individuals. Thus, in theory, a Nobel Prize is awarded primarily for supreme achievements, and only secondarily to specific individuals.

The limitation to the age of forty makes perfect sense for a prize given to young brilliant mathematicians to boost their scientific careers, but it makes little sense to compare such a prize to the Nobel Prize. One unfortunate consequence of this analogy is to perpetuate the myth that mathematicians necessarily do their best works when they are very young. We are all well aware of many major achievements obtained by mathematicians after the age of forty. While the myth is certainly false, young scientists do however have an important advantage over older ones in that, unencumbered by the myriad professional obligations of the latter, they have more flexibility, and maybe courage, to move in uncharted territories. But, given the age limitation of the Fields Medal, this advantage is, alas, not enhanced by the conceit of supreme achievement entailed by the comparison to the Nobel Prize. One can argue in fact that the Fields Medal produces the opposite result; namely, that ambitious young mathematicians crowd directions of research that offer the highest chances for a Fields Medal, rather than risk new ones. There are, certainly, exceptional Fields medalists who do not at all fit this description, but am I wrong to assert that at least many of them do?

Another obvious problem with treating the Fields Medal as a supreme achievement is the "winner takes all" mentality that it often generates. Indeed, outstanding works of the Fields medalists often build on the progress made by other mathematicians. Given the immense prestige bestowed by the medal, these previous works are later often minimized or even totally ignored.

In fact mathematics does not have any prize comparable with the Nobel Prize. The other major prizes—Abel, Shaw, and Wolf—don't have any age limitation but are almost always given to individuals, based on works done throughout their careers, rather than for specific achievements. Even when the prize is shared there is, in most cases, no identifiable connection between the recipients.

I am glad that the editors of *Notices* have decided to address the present status of the Fields Medal. In my view a major re-evaluation is long overdue.

—*Sergiu Klainerman*
Princeton University
`seri@math.princeton.edu`