Why Do We Do Mathematics? Thoughts on the Film *A Brilliant Young Mind*

by Mark Saul

A Brilliant Young Mind

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Directed by Morgan Matthews

Why do we do mathematics? Usually not because it's useful, although it is useful; and usually not because we can make a living doing it, although many of us can. We do mathematics because we enjoy it and because we are good at it.

The film *A Beautiful Young Mind* explores the meaning of mathematics in our personal lives. It tells the story of Nathan, a young man with Asperger's syndrome, a mild form of autism that causes difficulties in relating to others but is often associated with high mathematical ability. As I see it, the story is about how mathematics saves Nathan's emotional life.

As with many children who have this condition, Nathan quickly finds that he is good in mathematics and enjoys it. Which came first? The film does not answer this question. It is likely that Nathan finds in mathematics an order that he could not find in the world, an order that his mind seeks to impose on the world in ways the rest of us might consider inappropriate. Readers of *The Curious Incident of the Dog in the Night-Time* or the audience of the Tony Award-winning play will remember how the protagonist

Mark Saul is a consultant in mathematics education. He has just returned from acting as coordinator in the International Mathematical Olympiad. His e-mail address is marksaul@earthlink.net.

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there, much more deeply afflicted, sought order in ways that the rest of us find preposterous.

Lucky Nathan earns a spot on the British team for the prestigious International Mathematical Olympiad (IMO). Here the story intersects with reality. The IMO is an important part of the international mathematical community. It has helped to kindle interest in mathematics in many countries and has boosted the careers of many significant mathematicians.

The film gives an accurate, but necessarily limited, picture of the IMO. The opening ceremonies are actually much more elaborate than the film would suggest. Problems are significantly more difficult. And the event is much larger in scale. Still, the film gives examples of almost every experience that contestants have at the IMO, from personal contact with other competitors, to personal friction with teammates, to confusion and discovery at being in

a new and exotic venue. (The director consulted several mathematicians and former IMO team members, some of whom appear in the film: Geoffrey Smith, Lee Zhou Zhao, Joseph Myers, John Webb, and Andrew Carlotti). The film captures the delightfully ambiguous relationships among team leaders, combining friendly but serious rivalry with a camaraderie born of a common struggle with intractable

problems. Even for mathematicians without IMO experience, the social aspect of mathematical research will be familiar. It recurs in miniature at the IMO.

Perhaps a more important intersection with reality is how the IMO, both in the film and in life, can contribute towards the personal growth of students like Nathan. I have seen this first-hand: my involvement in the training of Olympiad-level students has brought me in contact with a number who resemble the protagonist. Here are some examples.

Peter (not his real name) was a student I worked with who clearly had trouble relating to others. But in Olympiad training, he came further out of his shell than anyone had ever seen. Holding court among his peers, he related one problem to another, suggested solutions, and even acted as a mentor to students who lacked his exceptional talent. Peter's mathematical ability immediately earned him a status in the group that was undeniable and unassailable and that he didn't have to struggle to earn. Mathematics offered him a bridge to emotional reality, which he crossed with little difficulty. And the joy of Peter's new freedom was written all over his face.

In another case, my colleagues and I couldn't even tell that Jorge had trouble in the Olympiad training program. He was the center of his group, lending it joy and energy, both intellectually and socially. Months later I met him at an international event where he won a medal. His parents had accompanied him—unusual for adolescents—and I wondered why. I recognized him in the midst of a crowd and greeted him enthusiastically. He took my extended hand but wouldn't meet my admiring eye. He barely mumbled a greeting, dropped my hand, and melted into the crowd. I was left wondering...until I met his parents later in the day. They were in fact astonished that I needed an explanation. Jorge suffered severely from Asperger's syndrome. His parents were there because he had great anxiety about traveling, about sleeping away from home, and about living with other students. But I had seen none of this in the preparatory program. Somehow the delight in doing mathematics, and even in doing it with others, overwhelmed the terror that Jorge otherwise found in life.

A Brilliant Young Mind documents a story very much like these. Nathan finds emotion, and even love, at the IMO. In the same way that Peter and Jorge used mathematics as a bridge to reality, Nathan uses it—or life uses it—to connect deeply with people in his life, with people from his past life, and ultimately with himself.

One way of appreciating this story is that it gives a deeper meaning to doing mathematics. Nathan grows in the film. At first he must endure the pain of relating to others in order to be able to work in mathematics. But a twist of events directly related to his participation in the IMO turns his world upside down. Nathan is able to use his experience in working an IMO problem as a tool to relate to others—and most importantly, to himself, to his early years, and to his inner emotional experience. The last scene of the film—viewers will see that it is “touching” in more than one way—shows Nathan experiencing life in a new way.

I suspect that this story can influence us and our field. Anyone reading this review is likely to know at least one colleague with more than average difficulties relating to others. It is likely that their careers could have been given a boost—or maybe have been given a boost—by using mathematics as a therapeutic tool. Perhaps we can create opportunities for young people with this sort of problem to use their mathematical ability to further their emotional growth, a sort of “therapy through mathematics.” Then Nathan's story will jump off the screen and into our reality.

Photo Credits

Films and Promotional materials distributed by Samuel Goldwyn Films.

Photo of Mark Saul courtesy of Mark Saul.

ABOUT THE AUTHOR

Mark Saul is pictured here in front of mathematical models at the mathematics department at the University of Modena. In thirty-five years of teaching, Mark has inspired thousands of mathematically gifted students. He was director of the American Mathematics Competitions at the Mathematical Association of America, of the Courant Institute's Center for Mathematical Talent, and of the Research Science Institute at MIT. He has edited *Quantum*, the Russian/American mathematics and physics journal for high-ability students, and *The Mathematics Teacher*, both for the National Council of Teachers of Mathematics.

Mark Saul