

The Mathematician's Shiva

A Review by Dennis DeTurck

The Mathematician's Shiva

by Stuart Rojstaczer

Penguin Random House, 2014

384 pages

An often-told story about GH Hardy concerns his evocation of the Riemann Hypothesis as a defense against fate. Every year he visited his friend Harald Bohr on the continent, and “proving the Riemann Hypothesis” was always on their agenda. One day, about to embark on a crossing of the English Channel during a particularly dangerous storm, he sent a postcard to Bohr, claiming that he had solved the problem. Even though he was an atheist, Hardy was certain that God would not give him the satisfaction of going down with the ship and leaving the world to believe that his proof had gone down with him.

Stuart Rojstaczer's novel *The Mathematician's Shiva* is built around a premise that is reminiscent of the Hardy story. It is told from the perspective of Alexander (Sasha) Karnokovitch, whose mother, Rachela, is rumored to have solved one of the fundamental mathematical problems of our time, namely to prove that the initial-value problem for the Navier-Stokes equations is well posed. The story begins with Rachela telephoning Sasha, who is about to give a talk in the atmospheric sciences department at the University of Nebraska, to tell him to come home because “I’m going to die today.” The rumors and gossip about her putative proof have so penetrated the

mathematical community that the immediate reaction of Sasha's mathematician friend Yakov is to say, “She must have finished today.”

The rumors are taken so seriously because Rachela has been an imposing presence in the community for decades: a student of the great Soviet mathematician Kolmogorov, she is credited with solving one of the famous Hilbert problems, namely the fifteenth, which concerns the rigorous justification of the Schubert calculus in enumerative geometry. After her defection from the Soviet Union in the 1950s, she became a professor at the University of Wisconsin, where she mentored numerous well-known and successful mathematicians.

The first part of the novel describes Rachela's death and uses the gathering of the family in Madison to provide a detailed account of the son's life, his knowledge of the family's history, his reasons for not going into mathematics, his failed marriage, and the relationships among the various very strong personalities within the family. Rojstaczer uses the device of interspersing chapters from Sasha's ongoing translation of Rachela's unpublished autobiography with his narration of more-current events and recollections about his family and about life in a home

that often included recent Soviet defectors and itinerant mathematicians. In her memoir, Rachela describes how, as a Polish Jew, she and her family were shipped off to a work camp near the Barents Sea and details the hardship, deprivation, and hunger that she experienced there, as well as the discovery of her incipient interest in and talent for mathematics.

In the second part of the book, mathematicians from all over the world descend on the family after the news spreads of Rachela's death, and they insist on participating in the week-long Shiva, or mourning ritual. The resulting conclave is strangely reminiscent of actual intensive

*a book about
mathematics,
mathematicians,
and
mathematical
culture*

Dennis DeTurck is Robert A. Fox Leadership Professor and professor of mathematics at the University of Pennsylvania. His e-mail address is deturck@sas.upenn.edu.

For permission to reprint this article, please contact: reprint-permission@ams.org.

DOI: <http://dx.doi.org/10.1090/noti1577>

gatherings of mathematicians around contemporary problems (the Bonn Arbeitstagung and the meetings of the Bourbaki and Besse groups come to mind), as the mathematicians spend their days at the Karnokovitch home and their nights at the Wisconsin math department working frantically on the Navier–Stokes problem. The group of mathematicians includes some of Rachela’s former students, co-authors, and colleagues, but also one of her

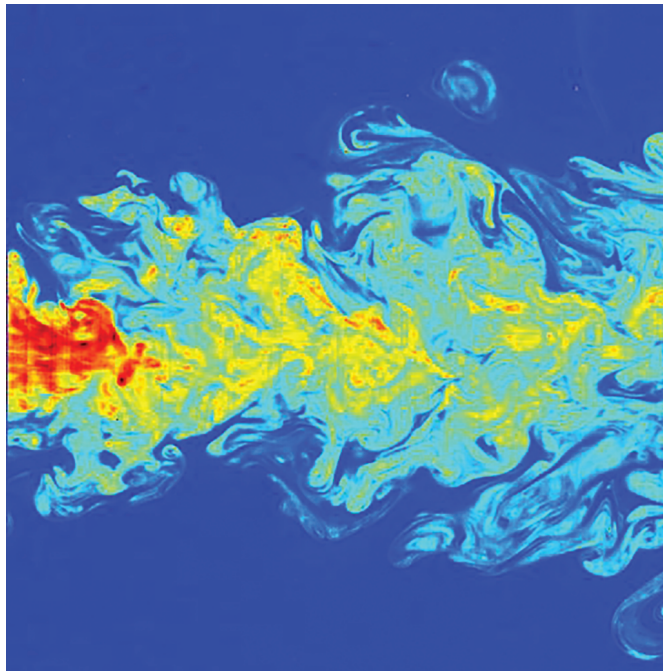


Figure 1. This picture displays the kind of phenomena modeled by the Navier–Stokes equations—and also evokes the complexity and turbulence exhibited in the lives of the characters in *The Mathematician’s Shiva*. It shows a false-color image of the far-field of a submerged turbulent jet, made visible by means of laser induced fluorescence.

greatest rivals, Vladimir Zhelezniak. Despite Rojstaczer’s disclaimer that “the living mathematicians in the novel are all made up,” it is hard not to notice the parallels between the mathematical careers of Zhelezniak and the eminent mathematician Vladimir Arnold: the two are respectively fictitious and real students of Kolmogorov who, while still students, solved Hilbert’s thirteenth problem¹ based on earlier work of Kolmogorov, although in the novel Zhelezniak confesses to having appropriated the work that Rachela did on the problem when she was a student, hence the root of their animosity.

Throughout the novel, Rojstaczer writes with warmth, empathy, and wit. *The Mathematician’s Shiva* is not a mathematics book, but it is a book *about* mathematics, mathematicians, and mathematical culture, all of which

“To ignore math in this story would be akin to listening to Frank Zappa without ever having taken hallucinogens.”

are essential to the story. Although he is a scientist and not a mathematician, Rojstaczer nonetheless provides penetrating insight into the frustrating but rewarding nature of mathematical research, particularly the duality between the individual and communal aspects of the enterprise. Without indulging too much in caricature or stereotype, the author explores the way the abstraction and other-worldliness of pure mathematics often gives rise to social awkwardness and a lack of self-awareness on the part of its practitioners. He illustrates this in a good-natured way, providing numerous vignettes that are by turns heartwarming, humorous, and hilarious—for instance, Zhelezniak’s arrest for late-night drunken cross-country skiing in the university Arboretum, or the mathematicians’ attempt to elicit meaningful information from the family parrot, an African gray named Pascha, whose first words in the book (in Polish no less) are “It has a singularity.”

Occasionally, though, Rojstaczer does bring the reader face to face with mathematics. For instance, in describing his youth, Sasha tells how his father (also a mathematician) often gave him interesting problems to grapple with, and he goes on to explain in some detail a simplified version of the Königsberg Bridge problem (an educational technique that might remind the reader of the book *In Code: A Mathematical Journey* by Sarah Flannery and David Flannery²). At another point, in an effort to explain mathematical proof in her memoir, Rachela illustrates by means of a proof of the Pythagorean theorem. And even though he is a meteorologist, Sasha makes a valiant effort at an explanation of the Navier–Stokes problem and describes some of his own work using the equation to model atmospheric phenomena. Why does Rojstaczer do this, even though the story could proceed without the mathematical exposition? “Why am I making your life difficult?” Sasha asks rhetorically, and then responds that while mathematics might seem obscure and irrelevant to you, “it isn’t to me, and it wasn’t to my mother or father. It is like breathing to us, and to ignore math in this story would be akin to listening to Frank Zappa without ever having taken hallucinogens, an incomplete experience.”

This quote illustrates what is perhaps the central theme of the novel, namely that the complexity of human identity, and how we often derive a fierce or even defiant pride from belonging, or even from only peripherally belonging, to a clan or group, particularly a group that

¹on expressing functions of many variables via chains of compositions of functions of only two variables, as in $F(x,y,z) = g(x, h(y,z))$

²Reviewed by Rafe Jones in the April 2003 Notices, www.ams.org/notices/200304/rev-jones.pdf.

is somewhat removed from mainstream society. Many such groups are featured, or at least touched upon, in the novel: immigrants, mathematicians, Jews, particularly Eastern European Jews who experienced but escaped both World War II and Soviet oppression (the book is liberally sprinkled with Yiddish and Polish, with a little Hebrew, German, and Russian mixed in), and women (particularly women scientists and mathematicians). For instance, there is a lengthy discussion among the mathematicians at the Shiva about why Rachela never received the Fields Medal—was it discrimination against Jews, Soviets, women, or some combination of these? Throughout the novel there are many instances of unflattering comparison between Russian and American attitudes towards mathematics, science, education, and hard work. From another direction, Sasha provides a compelling description of his feelings of only partially belonging to various groups—though born in the Soviet Union, he emigrated at a young enough age to be thoroughly Americanized; his work is mathematical but he is not a mathematician; at the Shiva he meets his estranged daughter and a granddaughter whom he didn't know existed.

The question of whether Rachela has indeed produced and concealed a solution of the Navier–Stokes problem, or whether the mathematicians gathered at her Shiva will make significant progress, generates some suspense along the lines of the play *Proof* by David Auburn.³ *Spoiler alert:* In contrast to that play, which leaves mostly ambiguity when the curtain falls, all of these questions are resolved by the end of the novel, perhaps somewhat too tidily: Rachela's proof is unearthed, deemed correct, and published posthumously in *Communications in Pure and Applied Mathematics*; her family receives the Clay Millennium Prize; and Sasha marries again and moves back to Madison.

All in all, *The Mathematician's Shiva* is a complicated tale that weaves together scientific, social, familial, and emotional themes in a compelling, sensitive, humorous, and even affectionate manner. Despite its focus on a very specific and unusual group of people, the writing invites the reader to become at least an honorary member of the tribe. After I read the book I recommended it to a few non-mathematician friends who, despite finding the novel's soupçon of mathematics somewhat intimidating, also thoroughly enjoyed the writing and the story. Stuart Rojstaczer has produced a successful first novel, and I hope we can look forward to many more.

Image Credits

Figure 1 by C. Fukushima and J. Westerweel. Used under the Creative Commons Attribution 3.0 Unported License. Photo of the reviewer courtesy of Dennis DeTurck.

³The production of *Proof* at City Center in New York City was reviewed by Dave Bayer in the October 2000 Notices, www.ams.org/notices/200009/rev-bayer.pdf, and the movie version was reviewed by Daniel Ullman in the March 2006 issue, www.ams.org/notices/200603/rev-ullman.pdf.

ABOUT THE REVIEWER

Dennis DeTurck is a recovering administrator and professor of mathematics. He is also the faculty director of Riepe College House, where he enjoys hanging out with about 500 of his closest friends.



Dennis DeTurck

samsi
NSF•Duke•NCSU•UNC

The Statistical and Applied Mathematical Sciences Institute (SAMS) is soliciting applications from statistical and mathematical scientists for up to 6 postdoctoral positions for the SAMS Research Programs for 2018-2019: **Program on Statistical, Mathematical, and Computational Methods for Precision Medicine (PMED)** and **Program on Model Uncertainty: Mathematical and Statistical (MUMS)**. Appointments will begin in **August 2018** and will typically be for two years, although they can also be arranged for one year. Appointments are made jointly between SAMS and one of its partner universities, where teaching opportunities may be available. The positions offer extremely competitive salaries, travel stipend, and health insurance benefits.

Criteria for selection of SAMS Postdoctoral Fellows include demonstrated research ability in statistical and/or applied mathematical sciences, excellent computational skills and the ability to communicate both verbally and in written form. Finally, the preferred applicant will have a strong interest in the SAMS program areas offered. The deadline for full consideration is **December 1, 2017**, although later applications will be considered as resources permit.

Please specify which of the two SAMS research programs you are applying for in your cover letter and why you believe you would be a good fit for SAMS and the program you choose.

To apply, go to mathjobs.org: **SAMSPD2018 Job #10496**

To see these programs visit:

www.samsi.info/pmed or www.samsi.info/mums

**** SAMS is an Affirmative Action/Equal Opportunity employer ****