



Princeton University, Department of Mathematics

Yakov G. Sinai

Yakov G. Sinai was born on 21 September 1935 in Moscow, Russia. Both of his parents, Gregory Sinai and Nadezda Kagan, were microbiologists with research careers. His grandfather, the mathematician Benjamin Fedorovich Kagan, was head of the Department of Differential Geometry at Moscow State University. Kagan had great influence on his grandson. He retired from his chair at Moscow State University in 1952, the year in which his grandson Yakov Grigorevich entered the Faculty of Mechanics and Mathematics.

Yakov Sinai received his B.S. (1957), his Ph.D. (1960), and his doctorate (1963) from Moscow State University. His advisor was the prominent Andrey Kolmogorov. Sinai was a Scientific Researcher at the Laboratory of Probabilistic and Statistical Methods at Moscow State University from 1960 to 1971. In 1971 he became a Professor at Moscow State University and a Senior Researcher at the Landau Institute of Theoretical Physics, Russian Academy of Sciences. Since 1993 he has been a Professor of Mathematics at Princeton University, USA, but has concurrently kept his position at the Landau Institute of Theoretical Physics. The Landau Institute was founded in 1964 and is located in Chernogolovka, some 40 kilometers northeast of Moscow; it is at the heart of a scientific network in the tradition of the Landau school.

During 1997-1998 Yakov Sinai was Thomas Jones Professor at Princeton University and in 2005 he was Moore Distinguished Scholar at the California Institute of Technology in Pasadena, California.

Yakov Sinai is one of the most influential mathematicians of the twentieth century. He has achieved numerous

groundbreaking results in the theory of dynamical systems, in mathematical physics and in probability theory. Many mathematical results are named after him, including Kolmogorov-Sinai entropy, Sinai's billiards, Sinai's random walk, Sinai-Ruelle-Bowen measures, and Pirogov-Sinai theory. Sinai is highly respected in both physics and mathematics communities as the major architect of the most bridges connecting the world of deterministic (dynamical) systems with the world of probabilistic (stochastic) systems. Perhaps it is only to be expected that he is the author of an article titled "Mathematicians and Physicists = Cats and Dogs?"¹

During the past half-century Yakov Sinai has written more than 250 research papers and a number of books. Sinai and his wife Elena B. Vul, a mathematician and physicist, have also written a number of joint papers. Yakov Sinai has supervised more than 50 Ph.D. students.

The deep contributions made by Sinai early in his career led to his being invited to lecture at the International Congress of Mathematicians in Stockholm in 1962. Sinai has since been an invited speaker at several important international conferences and has given many prestigious lectures worldwide. He has spoken four times at the International Congress of Mathematicians. He was a plenary speaker at the 1st Latin American Congress in Mathematics in 2000. In 2001 he was appointed Chairman of the Fields Medal Committee of International Mathematical Union, which

¹ *Bulletin (New Series) of the American Mathematical Society*, Vol 43, Number 4, October 2006, pages 563–565.



decided on the awards of the Fields Medals at the Congress in Beijing in the following year.

Awards and honours

Yakov Sinai has received many distinguished international awards. In 2013 he was awarded the Leroy P. Steele Prize for Lifetime Achievement from the American Mathematical Society. Other awards include the Wolf Prize in Mathematics (1997), the Nemmers Prize in Mathematics (2002), the Henri Poincaré Prize from the International Association of Mathematical Physics (2009) and the Dobrushin International Prize from the Institute of Information Transmission of the Russian Academy of Sciences (2009). Among his many recognitions are the Boltzmann Gold Medal from the Commission on Statistical Physics of the International Union of Pure and Applied Physics (1986) and the Dirac Medal from the Abdus Salam International Centre for Theoretical Physics in Trieste (1992).

Many mathematical societies and academies have elected Sinai to membership or honorary membership: the American Academy of Arts and Sciences (1983), the Russian Academy of Sciences (1991), the London Mathematical Society (1992), the Hungarian Academy of Sciences (1993), the United States National Academy of Sciences (1999), the Brazilian Academy of Sciences (2000), the Academia Europaea (2008), the Polish Academy of Sciences (2009) and the Royal Society of London (2009).

He has received honorary degrees from Warsaw University (1993), Budapest University of Science and Technology

(2002), the Hebrew University in Jerusalem (2005), and Warwick University (2010).

Professor Sinai is also respected as a teacher at Princeton. In the words of a former student, "It's quite inspirational to be in his class ... People feel an immediate urge to participate – there is a radiance which comes from him and inspires us."² He is also known for his persistence in the face of obstacles, be they bureaucratic or theoretical, a trait which has served him well throughout the years.

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For his 70th birthday in 2005 a special issue of the Moscow Mathematical Journal was dedicated to Sinai: "*Yakov Sinai is one of the greatest mathematicians of our time. The list of international prizes awarded to him as a sign of recognition of his scientific contributions is extremely long, and the list of his fundamental results is even longer. His permanent interest in mathematics and his exceptional scientific enthusiasm inspire several generations of scientists all over the world. His mere presence at a seminar or at a conference makes scientific life brighter and more exciting.*"

² Dennis Kosygin, as quoted in *The Daily Princetonian*, Dec. 3, 1996, pp. 1,7, on the occasion of the awarding of the Wolf Prize.

