

2009 Satter Prize

LAURE SAINT-RAYMOND received the 2009 AMS Ruth Lyttle Satter Prize in Mathematics at the 115th Annual Meeting of the AMS in Washington, DC, in January 2009.

Citation

The Ruth Lyttle Satter Prize in mathematics is awarded to Laure Saint-Raymond for her fundamental work on the hydrodynamic limits of the Boltzmann equation in the kinetic theory of gases.



Laure Saint-Raymond

Saint-Raymond and François Golse established the definitive connection between weak solutions of the Boltzmann and the Leray solution of the incompressible Navier-Stokes equation for an important set of collision kernels in their paper, "The Navier-Stokes limit of the Boltzmann equation for bounded collision kernels", *Invent. Math.* 155 (2004), no. 1, 81-161.

Saint-Raymond also established the convergence of weak solutions of the Boltzmann equation to the dissipative solutions of the incompressible Euler equation in the most general setting in "Convergence of solutions to the Boltzmann equation in the incompressible Euler limit", *Arch. Ration. Mech. Anal.* 166 (2003), no. 1, 47-80.

The study of hydrodynamic limit theorems dates back to the work of Maxwell, Boltzmann, and Hilbert and has been extensively investigated by mathematicians and physicists. The results of Laure Saint-Raymond are a landmark in the subject.

Biographical Sketch

Laure Saint-Raymond received her Ph.D. in applied mathematics from the Université Paris VII in 2000. She joined the Centre National de la Recherche Scientifique (CNRS) as a research scientist in the Laboratoire d'Analyse Numérique, Université Paris VI. In 2002, she became a professor in the Laboratoire J.-L. Lions, Université Paris VI. In 2007, she joined the École Normale Supérieure.

She has received several awards, including the Louis Armand Prize from the French Academy of Sciences, the Claude-Antoine Peccot Award from the Collège de France, and the Pius XI Gold Medal from the Pontificia Academia Scientiarum. In 2006, she was awarded, together with François Golse, the first SIAG/APDE Prize on behalf of the paper, "The Navier-Stokes limit of the Boltzmann equation for bounded collision kernels" published in *Inventiones Mathematicae*. In 2008 she received the European Mathematical Society Prize in Amsterdam.

Her research has focused on the study of problems in mathematical physics, including the Boltzmann

equation and its fluid dynamic limits, the Vlasov-Poisson system and its gyrokinetic limit, and problems of rotating fluids coming from geophysics. Her most striking work concerns the study of the hydrodynamic limits of the Boltzmann equation in the kinetic theory of gases, where she answered part of a question posed by Hilbert within the framework of his sixth problem.

Response

I am very grateful to the AMS and the Satter Prize Committee for awarding me this prize; it is truly encouraging to be recognized in this way. I am deeply indebted to my former adviser and collaborator François Golse, with whom part of the above cited work has been done.

I would like to use this opportunity to also thank all my American colleagues for their many kind invitations that I am too rarely able to honour. I thank especially mathematicians at Brown University, UCLA, MIT, Minnesota, and Harvard. I hope to have occasions in the future to develop more collaborations with them.

Finally, special thanks go to my family for their patience and their support.

About the Prize

The Satter Prize is awarded every two years to recognize an outstanding contribution to mathematics research by a woman in the previous six years. Established in 1990 with funds donated by Joan S. Birman, the prize honors the memory of Birman's sister, Ruth Lyttle Satter. Satter earned a bachelor's degree in mathematics and then joined the research staff at AT&T Bell Laboratories during World War II. After raising a family she received a Ph.D. in botany at the age of forty-three from the University of Connecticut at Storrs, where she later became a faculty member. Her research on the biological clocks in plants earned her recognition in the U.S. and abroad. Birman requested that the prize be established to honor her sister's commitment to research and to encouraging women in science. The prize carries a cash award of US\$5,000.

The Satter Prize is awarded by the AMS Council acting on the recommendation of a selection committee. For the 2009 prize, the members of the selection committee were: Benedict H. Gross (chair), Jane M. Hawkins, and Sijue Wu.

Previous recipients of the Satter Prize are: Dusa McDuff (1991), Lai-Sang Young (1993), Sun-Yung Alice Chang (1995), Ingrid Daubechies (1997), Bernadette Perrin-Riou (1999), Karen E. Smith (2001), Sijue Wu (2001), Abigail Thompson (2003), Svetlana Jitomirskaya (2005), and Claire Voisin (2007).