

# 1999 Satter Prize

The Ruth Lyttle Satter Prize was established in 1990 using funds donated by Joan S. Birman in memory of her sister, Ruth Lyttle Satter. Professor 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. Professor Birman requested that the prize be established to honor her sister's commitment to research and to encouraging women in science. The prize is awarded every two years to recognize an outstanding contribution to mathematics research by a woman in the previous five years. The amount of the prize is \$1,200.

At the 105th Annual Meeting of the AMS in January 1999 in San Antonio, the 1999 Satter Prize was awarded to BERNADETTE PERRIN-RIOU. The prize was awarded by the AMS Council on the recommendation of a selection committee consisting of Sun-Yung Alice Chang, Peter Sarnak, and Carol Wood.

The text that follows contains the committee's citation for the award, a brief biographical sketch, and a response from Bernadette Perrin-Riou upon receiving the award.

## Citation

The 1999 Satter Prize is awarded to Bernadette Perrin-Riou in recognition of her number theoretical research on  $p$ -adic  $L$ -functions and Iwasawa theory. Her results on the  $p$ -adic Gross-Zagier Formula and the related Birch and Swinnerton-Dyer Conjectures have striking applications to the arith-

metic of elliptic curves. Moreover, her foundational papers on  $p$ -adic representations and motives and on the Bloch-Kato Conjectures provide a framework and route to these basic general problems about  $L$ -functions of motives. In particular, her work provides the link between Kato's Euler System and  $p$ -adic  $L$ -functions. Her works have had a profound impact on the study of  $p$ -adic  $L$ -functions and Iwasawa theory, both in shaping it at present and in determining the direction in which it is moving.

## Biographical Sketch

Bernadette Perrin-Riou was born on August 1, 1955, at Les Vans, Ardèche, France. She was a student at the École Normale Supérieure de Jeunes Filles in 1974 (since then it has been unified with the men's École Normale d'Ulm). She did her Thèse de 3ème cycle with G. Poitou (1979) and her Thèse d'État with J. Coates (1983) in France. Starting in 1978, she was assistant, then Maître de Conférences, and finally professor at Université Pierre et Marie Curie. In 1994 she moved to the Université de Paris, Orsay. She was a speaker at the International Congress of Mathematicians (Zürich, 1994) and received the 1998 Charles-Louis de Saulces de Freycinet Prize of the French Académie des Sciences.



Photo Michel

**Bernadette Perrin-Riou**

## Response

I am very grateful to the AMS for awarding me the 1999 AMS Ruth Lyttle Satter Prize, and I am both very happy and honored.

On this occasion I cannot help but think of some of the people who taught me mathematics: Pascal Monsellier, my high school teacher, with whom I discovered vector spaces, abstract algebraic structures, concrete plane and space isometry groups, as well as the epsilons and etas; and later Roger Godement and his course “Le jardin des délices modulaires”. Georges Poitou and John Coates then introduced me to number theory, Galois cohomology, and elliptic curves. Eventually, I tried to extend the framework of elliptic curves using  $p$ -adic representations, which naturally led me to use Jean-Marc Fontaine’s ring of periods.

I was not aware that my work has had the influence stated in the citation, but I certainly had great pleasure in discovering and understanding mathematical objects and becoming “intimate” with them. On the other hand, sometimes I found it was rather frustrating not to be able to share this mathematics with more people. This may be because of the subject; not everyone in number theory can prove a theorem at the same time deep and easy to state!

Since this is a prize for women, I should probably add a few words without any claim to generality. My parents both had a scientific education, and I never thought of any other studies. I never felt a serious difference with men during my professional career, but this may be just because I was too innocent and unaware of the problem. However, I am still shocked by the small number of girls—about one-third—in my son’s high school science class.