2001 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. 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 current amount of the prize is $1,200 (in case of multiple recipients, the amount is divided equally).

At the 107th Annual Meeting of the AMS in January 2001 in New Orleans, the 2001 Satter Prize was awarded to KAREN E. SMITH 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), and Bernadette Perrin-Riou (1999).

The prize was awarded by the AMS Council on the recommendation of a selection committee consisting of Alexandra Bellow, Sun-Yung Alice Chang, and Bhama Srinivasan. The text that follows contains the committee's prize citations, brief biographical sketches of the prize winners, and responses from them upon receiving the prize.

Karen E. Smith photo ©U-M Photo Services, Martin Vloet.

Karen E. Smith

Sijue Wu

Karen E. Smith

Citation
The Ruth Lyttle Satter Prize in Mathematics is awarded to Karen E. Smith of the University of Michigan for her outstanding work in commutative algebra, which has established her as a world leader in the study of tight closure, an important tool in the subject introduced by Hochster and Huneke. It is also awarded for her more recent work, which builds new bridges between commutative algebra and algebraic geometry via the concept of tight closure. In particular, the prize is awarded for her papers (1) "Tight closure of parameter ideals", *Invent. Math.* **115** (1994), 41–60; (2) "F-rational rings have rational singularities", *Amer. J. Math.* **119** (1997), 159–180; and (3) (with Gennady Lyubeznik) "Weak and strong F-regularity are equivalent in graded rings", *Amer. J. Math.* **121** (1999), 1279–1290.

Biographical Sketch

Karen E. Smith was born in Red Bank, New Jersey, near the Jersey shore. Although she always loved mathematics and wanted to be a mathematician from a young age, she did not realize that one could have a career as a mathematician until college, when her freshman calculus teacher, Charles Fefferman, suggested it. She graduated from Princeton University in 1987 with a major in mathematics and certification to teach high school mathematics in New Jersey public schools. After teaching high school mathematics for a year, she looked into the possibilities of graduate school and learned that one could actually get full support to work on a Ph.D. At this point she decided to make a big change, and went off to the Midwest for graduate school.

At the University of Michigan, Smith wrote a thesis in commutative algebra under the direction of Melvin Hochster, finishing in 1993. After spending one year working with Craig Huneke at Purdue University on a National Science Foundation postdoctoral fellowship, she became a Moore Instructor at the Massachusetts Institute of Technology. Although she enjoyed Boston and was promoted to assistant professor at MIT, she and her husband moved back to Ann Arbor in 1997, where they had met nine years earlier. Smith is now teaching and doing research in algebraic geometry and commutative algebra at the University of Michigan. She has a three-year-old daughter, Sanelma, with whom she very much enjoys discussing mathematics.

Response

It is a great honor to be awarded the Ruth Lyttle Satter Prize, and it is truly encouraging to be recognized in this way. I would like to use this opportunity to publicly thank the many teachers, mentors, and collaborators who have guided and inspired me. In particular, my former advisor, Mel Hochster, first introduced me to tight closure and encouraged me; his influence on the cited papers above is strong. In fact, Mel Hochster has encouraged many women in mathematics to succeed at the very highest level and has supervised many female graduate students and postdocs who have gone on to become highly visible researchers in commutative algebra. Special thanks are also due to my coauthor, Gennady Lyubeznik, with whom it has been a pleasure to work on the above-cited paper.

I am also grateful to the AMS and to the prize committee for selecting me from among the many deserving researchers who were considered, and to Professor Joan Birman for her generosity and vision in supporting a prize that recognizes women mathematicians. My congratulations also to Professor Sijue Wu, with whom I am happy to share this honor.

Sijue Wu

Citation

The Ruth Lyttle Satter Prize in Mathematics is awarded to Sijue Wu for her work on a long-standing problem in the water wave equation, in particular for the results in her papers (1) "Well-posedness in Sobolev spaces of the full water wave problem in 2-D", *Invent. Math.* **130** (1997), 39–72; and (2) "Well-posedness in Sobolev spaces of the full water wave problem in 3-D", *J. Amer. Math. Soc.* **12,** no. 2 (1999), 445–495. By applying tools from harmonic analysis (singular integrals and Clifford algebra), she proves that the Taylor sign condition always holds and that there exists a unique solution to the water wave equations for a finite time interval when the initial wave profile is a Jordan surface.

Biographical Sketch

Sijue Wu was born on May 15, 1964, in China. She received her B.S. (1983) and M.S. (1986) from Beijing University, Beijing, China, and her Ph.D. (1990) from Yale University. Since then she has held the following positions: Courant Instructor at Courant Institute, New York University (2 years); assistant professor at Northwestern University (4 years); and assistant, then associate professor at the University of Iowa (2 years). She was also a member at the Institute for Advanced Study in the fall of 1992 and during the year 1996–97. She has been an associate professor at the University of Maryland, College Park, since 1998.

Response

It is a great honor for me to receive the Satter Prize. I am very happy about this and very happy to share this prize with Professor Karen E. Smith. I would like to thank the AMS and the selection committee for awarding this prize to me. I am very grateful to my teachers, friends, and colleagues, especially Ronald R. Coifman for his constant support and Lihe Wang for his friendship and his help.