Sophie Morel Wins the Inaugural AWM-Microsoft Research Prize in Algebra and Number Theory

by Gonit Sora - Tuesday, December 03, 2013

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The Association for Women in Mathematics (AWM) will present the FIRST AWM-MICROSOFT RESEARCH PRIZE IN ALGEBRA AND NUMBER THEORY to **Sophie Morel**, Professor of Mathematics at Princeton University, at the Joint Mathematics Meetings in Baltimore, MD, in January 2014. Established in 2012, the AWM-Microsoft Research Prize recognizes exceptional research in algebra and number theory by a woman early in her career. The award is made possible by a generous contribution from Microsoft Research. The biennial presentation of this prize serves to highlight to the community outstanding contributions by women in the field of algebra and to advance the careers of the prize recipients.

The inaugural 2014 AWM-Microsoft Research Prize in Algebra and Number Theory is awarded to Sophie Morel in recognition of her exceptional research in number theory. Morel received her DEA (French MA) at the Universite Paris 6, and her PhD from the Universite Paris-Sud. Her thesis advisor for both the DEA and PhD theses was Gerard Laumon.

Morel is a powerful arithmetic algebraic geometer who has made fundamental contributions to the Langlands program. Her research has been called "spectacularly original, and technically very demanding". Her research programme has been favourably compared to that of several Fields medalists. She accomplished one of the main goals of the Langlands program by calculating the zeta functions of unitary and symplectic Shimura varieties in terms of the L-functions of the appropriate automorphic forms. To achieve this, she introduced an innovative t-structure on derived categories which had been missed by many experts. Her book *On the Cohomology of Certain Noncompact Shimura Varieties* published in the Annals of Mathematics Studies series is described as a tour-de-force. Professor Morel found another remarkable application of her results on weighted cohomology. She gave a new geometric interpretation and conceptual proof of Brenti's celebrated but mysterious combinatorial formula for Kazhdan–Lusztig polynomials, which are of central importance in representation theory.

Before coming to Princeton University, Morel held positions at the Institute for Advanced Study in Princeton, the Clay Mathematics Institute, Harvard University and the Radcliffe Institute for Advanced Studies. After her appointment to Harvard, Jeremy Bloxham, dean of science in Harvard University Faculty of Arts and Sciences said of Morel "Sophie Morel is among the world's most promising young mathematicians working in number theory, algebraic geometry, and representation theory. Her doctoral thesis was extremely demanding and stunningly original, solving a problem that had been intractable for more than 20 years."

In 2012, at the 6th European Congress of Mathematics, ten young mathematicians were bestowed with the European Mathematical Society's (EMS) research prize. Sophie Morel was one of two women who received the prize that year.

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