

Michael Rapoport

Date of birth: 02 Oct 1948

Academic career

1976	These d'Etat Université de Paris-Sud
1976–1980	Assistant HU Berlin
1982–1986	Professor (C3), Heidelberg University
1986–1989	Professor (C3), Bonn
1989–1996	Professor (C3), Wuppertal University
1996–2003	Full Professor (C4), Cologne University
2003–	Full Professor (C4), Bonn



Honours

1992	Leibniz-Preis
2000	Prix Gay-Lussac/Humboldt

Invited Lectures

1992	Distinguished Ordway visitor in Mathematics, University of Minnesota
1994	Invited speaker, International Congress of Mathematicians
1995	Invited plenary speaker at Annual Conference of DMV
2001	Distinguished Ordway visitor in Mathematics, University of Minnesota

Research profile

My aim is to use algebraic geometry to establish higher reciprocity laws, which serve as a bridge between the field of arithmetic and the theory of automorphic forms. I am interested in Shimura varieties and their local variants— from the point of view of constructing interesting Galois representations, of identifying algebraic cycles on them, and of studying their deformations.

Editorships

Associate editor Duke Math. Journal (1995–2000); Editor Ergebnisse series Springer Verlag (1998–2003); Editor International Mathematics Research Notices (2003–)

Former Research Area D My contributions in this RA can be grouped into two main directions.

First, there has been substantial progress in my joint project with S. Kudla in giving arithmetic interpretations of the Fourier coefficients of Eisenstein series. The case of the modular curve with no ramifications has been completely solved and is documented in the monograph [KRY06] with S. Kudla and T. Yang. The basis for our results are the theory of Gross/Keating. In my seminar we elaborated an up-to-date account of this theory. Recently Kudla and I started to develop an analogous theory for the Shimura varieties associated to unitary groups [KR10].

Second, in the direction of Shimura varieties, I published a monograph [DOR10] on the theory of period spaces with Dat and Orlik. It leads from the elementary theory of filtered vector spaces to the first published account of the determination of the Euler-Poincaré characteristic of p -adic period domains.

Former Research Area E I developed further, in collaboration and close contact with G. Pappas and B. Smithling, the theory of local models of Shimura varieties. The paper [PR09a] treats the case of ramified unitary groups, and states the highly relevant "coherence conjecture" which has been proved recently in spectacular work of X. Zhu. Smithling has proved the topological flatness conjecture of loc.cit.

Another topic developed in [PR10] is the theory of \mathcal{G} -bundles on algebraic curves. Some conjectures of loc. cit. have been proved by J. Heinloth.

Former Research Area F I developed with G. Pappas [PR08] a theory of algebraic loop groups,

generalizing the theory of Faltings to the non-constant, or twisted, case. In [PR09b] Pappas and I gave a new framework for moduli spaces of Kisin modules with coefficient spaces, with possible applications to deformation problems of Galois representations.

Research Area DE

Supervised theses

Bachelor theses: 1

Master theses: 3, currently 2

Diplom theses: 19, currently 2

PhD theses: 9, currently 2

Selected PhD students

Torsten Wedhorn (1998), now Professor Paderborn; Ulrich Görtz (2000), now Professor Duisburg-

Essen; Sascha Orlik (1999), now Professor Wuppertal; Eva Viehmann (2005), now Heisenberg Fellow Bonn; Ulrich Terstiege (2009), now Assistant Duisburg-Essen; Eugen Hellmann (2011), now Assistant Bonn; Peter Scholze, now PhD student Bonn.

Habilitations

Torsten Wedhorn (2005); Ulrich Görtz (2006); Sascha Orlik (2007); Eva Viehmann (2011).

Selected publications

- [AMRT10] ASH, Avner ; MUMFORD, David ; RAPOPORT, Michael ; TAI, Yung-Sheng: *Smooth compactifications of locally symmetric varieties*. Second. Cambridge : Cambridge University Press, 2010 (Cambridge Mathematical Library). – x+230 S. – ISBN 978-0-521-73955-9. – With the collaboration of Peter Scholze
- [DOR10] DAT, Jean-Francois ; ORLIK, Sascha ; RAPOPORT, Michael: *Cambridge Tracts in Mathematics*. Bd. 183: *Period domains over finite and p-adic fields*. Cambridge : Cambridge University Press, 2010. – xxii+372 S. – ISBN 978-0-521-19769-4
- [KR10] KUDLA, Stephen ; RAPOPORT, Michael: Special cycles on unitary Shimura varieties I. Unramified local theory. In: *Inventiones Mathematicae* (2010), S. 1–54. – ISSN 0020-9910. – 10.1007/s00222-010-0298-z
- [KRY06] KUDLA, Stephen S. ; RAPOPORT, Michael ; YANG, Tonghai: *Annals of Mathematics Studies*. Bd. 161: *Modular forms and special cycles on Shimura curves*. Princeton, NJ : Princeton University Press, 2006. – x+373 S. – ISBN 978-0-691-12551-0; 0-691-12551-1
- [PR08] PAPPAS, G. ; RAPOPORT, M.: Twisted loop groups and their affine flag varieties. In: *Adv. Math.* 219 (2008), Nr. 1, S. 118–198. – ISSN 0001-8708. – With an appendix by T. Haines and Rapoport
- [PR09a] PAPPAS, G. ; RAPOPORT, M.: Local models in the ramified case. III. Unitary groups. In: *J. Inst. Math. Jussieu* 8 (2009), Nr. 3, S. 507–564. – ISSN 1474-7480
- [PR09b] PAPPAS, G. ; RAPOPORT, M.: ϕ -modules and coefficient spaces. In: *Mosc. Math. J.* 9 (2009), Nr. 3, S. 625–663, back matter. – ISSN 1609-3321
- [PR10] PAPPAS, Georgios ; RAPOPORT, Michael: Some questions about G-bundles on curves. In: *Algebraic and arithmetic structures of moduli spaces (Sapporo 2007)* Bd. 58. Tokyo : Math. Soc. Japan, 2010, S. 159–171
- [RZ96] RAPOPORT, M. ; ZINK, Th.: *Annals of Mathematics Studies*. Bd. 141: *Period spaces for p-divisible groups*. Princeton, NJ : Princeton University Press, 1996. – xxii+324 S. – ISBN 0-691-02782-X; 0-691-02781-1