

**Priv.-Doz. Dr. Ulrich Görtz**

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## Curriculum Vitae

### Personal data

Date of birth: March 19, 1973

Marital status: Married, 2 daughters

### Education

Habilitation, Universität Bonn, 2006.

Habilitation thesis: Reduction of Shimura varieties and affine flag varieties

Referees, internal: G. Faltings, M. Rapoport;

external: B.-C. Ngô (Paris), G. Pappas (Michigan), Th. Zink (Bielefeld)

Doctor of Mathematics (Dr. rer. nat.), Universität zu Köln, 2000.

Advisor: Prof. Dr. M. Rapoport

Thesis: On the flatness of local models of certain Shimura varieties  
of PEL type

Diplom, Westfälische Wilhelms-Universität Münster, 1997.

Advisor: Prof. Dr. S. Bosch

Thesis: Treuflacher Descent kohärenter Moduln in der rigiden Geometrie  
(*Faithfully flat descent of coherent modules in rigid geometry*)

Vordiplom, Westfälische Wilhelms-Universität Münster, 1995.

### **Appointments**

Jan. 2008 – Dec. 2010: Heisenberg research grant of the Deutsche Forschungsgemeinschaft (German Research Foundation)

Sept. 2003 – current: Wissenschaftlicher Assistent, Universität Bonn.

April 2002 – Sept. 2003: Wissenschaftlicher Assistent, Universität zu Köln.

July 1999 – March 2002: Wissenschaftlicher Mitarbeiter, Universität zu Köln.

Oct. 1997 – June 1999: Wissenschaftliche Hilfskraft, Universität zu Köln.

April 1997 – Sept. 1997: Wissenschaftliche Hilfskraft, Westfälische Wilhelms-Universität Münster.

Oct. 1995 – March 1997: Studentische Hilfskraft, Westfälische Wilhelms-Universität Münster.

### **Longer term visits**

February/March 2006: Visitor at the University of Chicago.

March 2003, June 2003: Visitor at the Fields Institute, Toronto.

Sept. 2000 – July 2001: Member of the School of Mathematics, Institute for Advanced Study, Princeton.

Feb. 2000 – April 2000: Visitor of the special semester on Automorphic Representations and Shimura Varieties at the Institut Henri Poincaré, Paris.

### **Miscellaneous**

2008: Von-Kaven-Ehrenpreis of the German Research Foundation

## Publications

- [1] *On the connectedness of Deligne-Lusztig varieties*, to appear in Repr. Th., arXiv:math/0807.2786 (2008), 5 p.
- [2] *Alcove walks and nearby cycles on affine flag manifolds*. J. of Algebraic Combinatorics **26** no. 4 (2007), 415–430.
- [3] *Arithmetic intersection numbers*, in: ARGOS Seminar on Intersections of Modular Correspondences. Astérisque **312** (2007), 15–24.
- [4] *A sum of representation numbers*, in: ARGOS Seminar on Intersection of Modular Correspondences. Astérisque **312** (2007), 9–14.
- [5] mit T. Haines: *The Jordan-Hölder series for nearby cycles on some Shimura varieties and affine flag varieties*. J. Reine Angew. Math. **609** (2007), 161–213.
- [6] mit T. Haines, R. Kottwitz, D. Reuman: *Dimensions of some affine Deligne-Lusztig varieties*. Ann. sci. de l'E. N. S. 4<sup>e</sup> série, t. **39** (2006), 467–511.
- [7] mit T. Haines: *Bounds on weights of nearby cycles and Wakimoto sheaves on affine flag manifolds*. manuscripta math. **120/4** (2006), 347–358.
- [8] *Topological flatness of local models in the ramified case*. Math. Z. **205** (2005), 775–790.
- [9] *Computing the alternating trace of Frobenius on the sheaves of nearby cycles on local models for  $GL_4$  and  $GL_5$* . J. Alg. **278** (2004), 148-172.
- [10] *On the flatness of local models for the symplectic group*. Adv. in Math. **176** (2003) 89-115.
- [11] *On the flatness of models of certain Shimura varieties of PEL type*. Math. Ann. **321** (2001), 689-727.
- [12] mit S. Bosch: *Coherent modules and their descent on relative rigid spaces*. J. Reine Angew. Math. **495** (1998), 119-134.

## Preprints

- [1] with M. Hoeve: *Ekedahl-Oort strata and Kottwitz-Rapoport strata*, arXiv:math/0808.2537 (2008), 10 p.
- [2] with C.-F. Yu: *The supersingular locus in Siegel modular varieties with Iwahori level structure*, arXiv:math/0807.1229 (2008), 27 p.
- [3] with T. Haines, R. Kottwitz, D. Reuman: *Affine Deligne-Lusztig varieties in affine flag varieties*, arXiv:math/0805.0045 (2008), 38 S.
- [4] with C.-F. Yu: *Supersingular Kottwitz-Rapoport strata and Deligne-Lusztig varieties*, arXiv:math/0802.3260 (2008), 29 S.

## Reports (not refereed)

- [1] *Affine Deligne-Lusztig varieties*, to appear in: Math. Forschungsinst. Oberwolfach, Report No. 30/2007.
- [2] *Lokale Modelle von Shimura-Varietäten und ihre Garben der verschwindenden Zykel*, in: Y. Tschinkel, Seminars 2003/04, Math. Inst. der Univ. Göttingen.

## Theses

- [1] *Reduktion von Shimura-Varietäten und affine Flaggenvarietäten*, Habilitationsschrift, Math.-Nat. Fakultät der Universität Bonn, 2006.
- [2] *On the flatness of local models of certain Shimura varieties of PEL type*, Dissertation, Math.-Nat. Fakultät der Universität zu Köln, 2000.
- [3] *Treueflacher Descent kohärenter Moduln in der rigiden Geometrie*, Diploma thesis, Math. Institut der Universität Münster, 1997.

## Teaching experience

### Courses

- Course on **Algebraic Geometry 2** (4 hours per week plus exercise group (2 hours per week)), winter term 2007/08, Universität Bonn
- Course on **Algebraic Geometry 1** (4 hours per week plus exercise group (2 hours per week)), summer term 2007, Universität Bonn
- Course on **Algebraic Geometry** (4 hours per week plus exercise group (2 hours per week)), winter term 2005/06, Universität Bonn
- Course on **Modular Curves** (4 hours per week), summer term 2005, Universität Bonn
- Course on **Elliptic Curves** (4 hours per week), winter term 2002/03, Universität zu Köln

### Seminars for Students

- Seminar on **Deformations of Galois representations**, winter term 2008/09, Universität Bonn
- Seminar on **Linear Algebraic Groups**, summer term 2008, Universität Bonn
- Seminar on **Etale Cohomology 2**, summer term 2008, Universität Bonn
- Seminar on **Etale Cohomology 1**, winter term 2007/08, Universität Bonn
- Seminar on **Formal Groups**, summer term 2007, Universität Bonn

As an assistant of Prof. M. Rapoport I co-organized the following seminars.

- Seminar on **Period Domains**, Universität Bonn
- Seminar on **Abelian Varieties**, Universität Bonn

- Seminar on the **Zeta Function of Algebraic Curves over Finite Fields**, Universität zu Köln
- Seminar on *Serre, Cours d'Arithmétique*, Universität zu Köln

### **Oberseminar**

Since the winter term 1997/98 I participated in the Oberseminar (an advanced seminar) of Prof. Rapoport's group every term (except for the academic year 2000/01, which I spent in Princeton), and in the following terms I authored the program for this seminar:

- Summer term 2008, Perverse sheaves
- Summer term 2007, The fundamental lemma for base change in the parahoric case
- Winter term 2006/07, Iwahori-Hecke Algebras
- Summer term 2006, The fundamental lemma for unitary groups
- Winter term 2005/06, The moduli space of Hitchin pairs
- Winter term 2003/04, Intersection numbers of modular correspondences
- Summer term 2000, The wonderful compactification and the compactification of  $PGL_n^r/PGL_n$  of Lafforgue

### **Miscellaneous**

- Course on affine Springer fibers and affine Deligne-Lusztig varieties, as part of the workshop on *Affine flag varieties and principal bundles* (Organizers: Heinloth, Schmitt), FU Berlin, September 2008
- Talk about Fermat's Last Theorem, addressed to the general public, in the Wissenschaftszelt of the Universität Bonn, July 2008
- Course on Shimura Varieties (March 22, 23, and May 5, 2006, Universität Mainz)

## Advising

### PhD students

1. Martin Kreidl  
Start: October 2007  
Thesis topic: *Normality of Schubert varieties in  $p$ -adic affine Grassmannians.*  
Kreidl has a position within my project in the SFB/TR 45.

### Diploma theses

1. Alexander Ivanov  
(with Prof. M. Rapoport and myself as joint advisors)  
Start: April 2008  
Thesis topic: *Cohomology of affine Deligne-Lusztig varieties.*
2. Philipp Hartwig  
Start: April 2008  
Thesis topic: *The moduli space of abelian varieties of dimension 3 with Iwahori level structure.*

### Finished Diploma Theses

1. Andreas Müller (September 2008)  
Thesis topic: *Singularities of minimal degenerations in affine Grassmannians.*

## Organization

### Workshop Bonn/Paderborn (jointly with T. Wedhorn)

- Workshop on Nakajima's quiver varieties winter term 2008/09 (22.11.08 Bonn, 06.12.08 Paderborn, 17.01.09 Bielefeld).  
<http://www2.math.uni-paderborn.de/people/torsten-wedhorn/workshop-koecher-varietaeten.html>
- Workshop on Compactifications of Moduli Spaces and Tropical Geometry (with T. Wedhorn), winter term 2007/08.  
[http://www.math.uni-bonn.de/people/ugoertz/workshop\\_ws0708.html](http://www.math.uni-bonn.de/people/ugoertz/workshop_ws0708.html)

### Workshops

as part of the *Kleine Arbeitsgemeinschaft Algebraische Geometrie und Zahlentheorie* (a series of (at least) two one-day workshops per semester, dealing with topics in algebraic geometry and number theory). I (co-)organized the following workshops:

- Néron Models (January 28, 2006, with J. Stix)
- $\mathcal{D}$ -Modules (October 18, 2003, with T. Wedhorn)
- Iwasawa Theory (October 19, 2002)
- Intersection Cohomology (May 04, 2002, with J. Heinloth)
- Simple Singularities (January 19, 2002, with E. Lau)
- Projectivity of the Moduli Spaces of Stable Curves (April 15, 2000, with F. Bittner)
- Complex Algebraic Surfaces (February 12, 2000, with O. Bültel)
- Induced Representations of  $GL_n$  over a local field, after Bernstein and Zelevinsky (November 27, 1999, with T. Wedhorn)
- Jacobians of Curves (October 04, 1999)

### Conference

Together with S. Orlik, T. Wedhorn and S. Müller-Stach, I have organized a **Conference on Arithmetic Algebraic Geometry**, on the occasion of M. Rapoport's 60th birthday, which took place in October 2008, in Bonn. The conference has 114 registered participants. It was an activity of the Sonderforschungsbereich Mainz, Bonn, Essen, and was also supported by the Hausdorff Center for Mathematics. Further information, such as the list of speakers, is available at <http://aag-bonn08.sfb45.de/> .

## Grants/Third-party funds

- Principal Investigator of the project on Affine Deligne-Lusztig Varieties, and coinvestigator of the project on Local Models of Shimura Varieties within the Transregio-Sonderforschungsbereich 45 on “Periods, Moduli spaces, and Arithmetic of Algebraic Varieties” Mainz, Bonn, Essen. The project on Affine Deligne-Lusztig Varieties includes one position for a PhD student, held by Martin Kreidl since October 2007.
- Heisenberg grant of the Deutsche Forschungsgemeinschaft (German Research Foundation), July 2007.
- Post-Doc grant of the Deutsche Forschungsgemeinschaft (German Research Foundation) (2000/01), used for my stay at the Institute for Advanced Study, Princeton.
- Offer of a Post-Doc grant of the Deutscher Akademischer Austauschdienst (German Academic Exchange Service) (2000, not used).

## Selected talks

- University of Freiburg (Colloquium), October 2008
- University of Göttingen (Colloquium), June 2008
- 1<sup>st</sup> Erlangen Representation Theory Days (Organizer: Knop), June 2008
- North German Algebraic Geometry Seminar, (Organizers: Farkas, Kramer), HU Berlin, Mai 2008.
- Conference on *Automorphic Forms, Geometry and Arithmetic* (Organizers: Kudla, Schwermer), Math. Forschungsinst. Oberwolfach, February 2008
- Conference on *Buildings: Interactions with Algebra and Geometry* (Organizers: Kramer, Mühlherr, Schneider), Math. Forschungsinst. Oberwolfach, January 2008
- Conference on Non-archimedean Period Domains, Max-Planck-Institut für Mathematik, Bonn (Org.: Dat, Orlik), September 2007
- Conference on Automorphic Forms and Shimura varieties, ICTP Trieste, (Org.: Fargues, Ngô, Prasad), July 2007
- Conference on Algebraic Number Theory (Org.: Kings, Kisin, Venjakob), Math. Forschungsinst. Oberwolfach, June 2007
- Université Paris Nord, Séminaire de Géométrie Arithmétique (Dat), January 2007
- ETH Zürich, Number Theory Seminar (Fuchs, Imamoglu, Pink, Wüstholtz), December 2006
- Max-Planck-Institut für Mathematik, Bonn, Number theory lunch seminar, May 2006
- University of Chicago, Algebraic geometry seminar (Kottwitz), March 2006
- IRMA Strasbourg, Séminaire “Arithmétique et Géométrie algébrique” (Wintenberger), February 2004

- Conference on Arithmetic Algebraic Geometry, Max-Planck-Institut Bonn (Final conference of the European Network), September 2003
- Workshop on Shimura Varieties and Related Topics, Fields Institute, Toronto, March 2003
- Université de Paris VI Jussieu, Séminaire “Groupes Réductifs et Formes Automorphes” (Vignéras), December 2002
- Conference on Shimura Varieties at JAMI/Johns-Hopkins-University (2001)
- Harvard University, Algebraic Geometry Seminar (Kazhdan), March 2001
- Columbia University, New York, Algebraic Geometry Seminar (Zhang), March 2001
- Institut Henri Poincaré, Paris, Seminar during the semester on automorphic forms, March 2000

### **Forthcoming conferences**

- Conference on Algebraic Number Theory (Org.: Kings, Kisin, Venjakob), Math. Forschungsinst. Oberwolfach, June 2009

## Professional Service

I have written **referee**'s reports for, among others: Comment. Math. Helv., Compositio Mathematica, Duke Mathematical Journal, Inventiones math., Proceedings of the A.M.S., Transformation Groups.

Since November 2003, I am a reviewer for **MathSciNet**. Since February 2007, I am a reviewer for **Zentralblatt**.