DR. GERALD HÖHN

Curriculum Vitae

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EDUCATION

Habilitation in Mathematics:	University of Freiburg, December 2003
Ph.D. in Mathematics:	University of Bonn, October 1995
Dissertation:	*Self-dual vertex operator super algebras and the Baby Monster*
Academic advisors:	Prof. Y. Manin / Prof. F. Hirzebruch
Diploma in Mathematics:	University of Bonn, February 1992
Thesis title:	*Complex elliptic genera and S^1-equivariant cobordism theory*
Academic advisors:	Prof. F. Hirzebruch / Prof. D. Zagier
German Abitur:	Summer 1985

EMPLOYMENT

Associate Professor of Mathematics, Kansas State University	2011–present
Assistant Professor of Mathematics, Kansas State University	2004–2011
Member of the DFG-Research Group "Arithmetik", University of Heidelberg, Germany	2003–2004
Visiting Assistant Professor of Mathematics, University of Freiburg, Germany	1997–2003

DOCTORAL and POST-DOCTORAL RESEARCH POSITIONS

Cambridge University (Scholarship of German Science Foundation)	Mar. 1997–Sep. 1997
University of Bonn (Post-Doc)	Jan. 1997–Feb. 1997
Cambridge University (Post-Doc)	Nov. 1996–Dec. 1996
University of California, Santa Cruz (Scholarship of German Science Foundation)	Nov. 1995–Oct. 1996
Rutgers University, New Jersey	May 1996
Max-Planck Institute for Mathematics, Bonn (Doctoral position)	Apr. 1995–Oct. 1995
University of Bonn (Ph.D. Scholarship at Graduiertenkolleg)	Mar. 1992–Mar. 1995

RESEARCH INVITATIONS and VISITING APOINTMENTS

- Max-Planck Institute for Mathematics, Bonn (Dec. 2015)
- Simons Center for Geometry and Physics (Sep. 2013)
- Visiting Professor, Darmstadt, Germany (Spring 2013)
- Hausdorff Research Institute for Mathematics, Bonn (Sep. 2012–Dec. 2012)
- Max-Planck Institute for Mathematics, Bonn (Jan. 2009–Mar. 2009)
- Visiting Professor, Hamburg, Germany (Spring 2009)
- Tokyo University, Japan (July 2008)
- Bordeaux, France (April 1999)

HONORS AND AWARDS

- Four times a winner of the German mathematical competition for high school students (Bundessieger im Bundeswettbewerb Mathematik), 1982–1985.
- Scholarship of the Studienstiftung des Deutschen Volkes, 1985–1990.
- Award for Diploma thesis from the German Mathematical Society, 1992.
- 3-year scholarship of the Graduiertenkolleg for mathematics at University of Bonn, 1992–1994.
- 2-year Post-Doc scholarship of the German Science Foundation, 1995–1996.
- 14 months Kansas NSF EPSCoR grant, 2005–2006.
- organizer (with Nikulin and N. Scheithauer) of the international conference on "Lie algebras, vertex algebras and automorphic forms" at the International Centre of Mathematical Sciences in Edinburgh, UK, September 2009.
- 5-year Simons Foundation Collaboration Grant on "Moonshine, Vertex Operator Algebras and Geometry", 2015–2020.

INVITED TALKS AT LARGE CONFERENCES

- *Self-dual vertex operator super algebras and the Baby Monster,* session talk given at annual meeting of the German mathematical society, 1995.
- *Analogies between Codes, Lattices and VOAs,* talk given at international conference on integral lattices, Seoul, 1998.
- *Genera of vertex operator algebras and 3-dimensional topological quantum field theory,* talk given at conference on vertex operator algebras, Fields Institute, 2000.
- *Natural construction of generalized Kac-Moody Lie-algebras,* talk given at conference on vertex operater algebras, University of Tokyo, December 2002.
- *Generalized Moonshine for the Baby Monster,* talk given at conference on Lie algebras, Fields Institute, 2003.
- Several talks at Oberwolfach meetings.
- *Generalized Moonshine for the Baby Monster,* talk given at workshop on Tensor Categories, Erwin Schroedinger Institute in Vienna, Austria, June 21 to July 2, 2004.
- *Generalized Moonshine for the Baby Monster,* talk given at conference on "Moonshine - the First Quarter Century and Beyond", Edinburgh, UK, July 5 to 13, 2004.

- *Self-dual Vertex Operator Algebras,* talk given at international conference on "Vertex operator algebras and related areas" at Illinois State University, July 7 to 11, 2008.
- *Vertex Algebra Constructions of Generalized Kac-Moody Algebras — An overview,* talk given at international conference on "Lie algebras, vertex algebras and automorphic forms" at the International Centre of Mathematical Sciences in Edinburgh, UK, September 2009.
- *Classification approaches for rational vertex operator algebras,* talk given at the conference "Conformal Field Theory, Automorphic Forms and Related Topics" in Heidelberg, Germany, September 19 to 23, 2011.
- *Conformal Designs,* talk given at the conference "Shanghai Conference on Algebraic Combinatorics" in Shanghai, China, August 17 to 22, 2012.
- *Mathieu Moonshine,* talk given at the meeting "Subfactors, Conformal Field Theory and Vertex Operator Algebras" at Vanderbilt University, May 2–8.
- *Mathieu Moonshine and Symmetries of Hyperkähler Manifolds,* talk given at the workshop "String, Lattice, and Moonshine" December 4–6, 2014 at Rikkyo University, Tokyo, Japan.
- *Understanding 71: Computational methods in Group and Vertex Algebra theory,* talk given at the "Conference in Finite Groups and Vertex Algebras" dedicated to Robert L. Griess on the occasion of his 71st birthday, August 22–26, 2016 at Institute of Mathematics, Academia Sinica, Taipei, Taiwan.
- *Symplectic automorphism of Hyperkähler Manifolds of type $K3^{[2]}$ and the equivariant elliptic genus,* talk given at the conference "Moonshine and K3 surfaces" November 7–11, 2016 at Nagoya University, Tokyo, Japan.

SUPERVISED GRADUATE STUDENTS

- T. Detweiler, *Finite projective planes and self-dual binary codes* (Master report, 2007).
- J. Galstad, *A new class of self-dual codes over $\mathbf{Z}_2 \times \mathbf{Z}_2$* (Master thesis, 2007).
- N. Ahmad, *S^1-equivariant manifolds and complex elliptic genera* (Ph.D. thesis, 2011).
- N. Junla, *Genera of vertex operator algebras* (Ph.D. thesis, 2014).

OTHER ACTIVITIES

- The online database of Vertex Operator Algebras and Modular Categories, `http://www.math.ksu.edu/~gerald/voas/`

PAPERS

[1] *Komplexe elliptische Geschlechter und S^1-äquivariante Kobordismustheorie*, Diplomarbeit, Bonn (1991).

[2] with N.-P. Skoruppa, *Un résultat de Schinzel*, Journal de Théorie des Nombres de Bordeaux **5** (1993), 185.

[3] *Selbstduale Vertexoperatorsuperalgebren und das Babymonster*, Ph.D. thesis, Universität Bonn, 1995, see: Bonner Mathematische Schriften **286**.

[4] *Self-dual Vertex Operator Superalgebras with Shadows of large minimal weight*, Internat. Math. Res. Notices **13** (1997), 613–621, q-alg/9608023.

[5] with Chonying Dong and Robert Griess, *Framed Vertex Operator Algebras, Codes and the Moonshine Module*, Comm. Math. Phys. **193** (1998), 407–448, q-alg/9707008.

[6] *Self-dual Codes over the Kleinian four group*, Mathematische Annalen, **327** (2003), 227–255, math.CO/0005266.

[7] with Robert Griess, *Virasoro Frames and their Stabilizers for the E_8 Lattice type Vertex Operator Algebra*, 2001, Journal f'ur die reine und angewandte Mathematik (Crelle), **561** (2003), 1–37, math.QA/0101054.

[8] *Genera of Vertex Operator Algebras and three-dimensional topological quantum field theories*, Vertex operator algebras in mathematics and physics (Toronto, ON, 2000), 89–107, Fields Inst. Commun., 39, Amer. Math. Soc., Providence, RI, 2003, math.QA/0209333.

[9] with Nils Scheithauer, *A natural construction of Borcherds' Fake Baby Monster Lie algebra,* American Journal of Mathematics **125** (2003), 655–667.

[10] *The Group of Symmetries of the shorter Moonshine Module*, 2002, revised version 2010, Abhandlungen aus dem Mathematischen Seminar der Universität Hamburg **80** (2010), 275–283, math.QA/0210076.

[11] *Generalized Moonshine for the Baby Monster*, 2003, Habilitationsschrift.

[12] *Conformal designs based on Vertex Operator Algebras*, Advances in Mathematics, **217** (2008), 2301–2335.

[13] *Self-Dual Vertex Operator Superalgebras of large minimal weight*, 2007, submitted to for Communications in Number Theory and Physics, arXiv:0801.1822.

[14] *On a theorem of Garza regarding algebraic integers with real conjugates,* International Journal of Number Theory **7** (2011), 943–945, arXiv:1003.4039.

[15] with Ching Hung Lam und Hiroshi Yamauchi, *McKay's E_7 observation on the Babymonster,* International Mathematical Research Notices (2012) No. 1, 166–212, arXiv:1002.1777.

[16] with Ching Hung Lam und Hiroshi Yamauchi, *McKay's E_6 observation on the the Fischer group* Fi_{24}, Communications in Mathematical Physics **310** (2012), 329–365, arXiv:1002.1777.

[17] with Julia Galstad, *A new class of self-dual codes over* $\mathbf{Z}_2 \times \mathbf{Z}_2$, submitted, arXiv:1008.1927.

[18] with Nils Scheithauer, *A generalized Kac Moody algebra of rank* 14, J. of Algebra **404** (2014), 222–239, arXiv:1009.5153.

[19] with Thomas Creutzig and Tsuyoshi Miezaki, *The McKay-Thompson series of Mathieu Moonshine modulo two,* Ramanujan Journal **34** (2014), 319–328, arXiv:1211.3703.

[20] with Thomas Creutzig, *Mathieu Moonshine and the Geometry of K3 Surfaces,* Journal of Communications in Number Theory and Physics" **8** (2014), 295–328, arXiv:1309.2671.

[21] with Geoffrey Mason, *Finite groups of symplectic automorphisms of hyperkähler manifolds of type* $K3^{[2]}$, arXiv:1409.605, submitted.

[22] with Geoffrey Mason, *The* 290 *fixed-point sublattices of the Leech lattice,* Journal of Algebra **448** (2016), 618–637, arXiv:1505.06420.

[23] *On the genus of the Moonshine module*, arXiv:1708.05990, submitted.