

# Sven Möller

## *Curriculum vitæ*

### Personal Information

Email [math@moeller-sven.de](mailto:math@moeller-sven.de)  
Homepage [www.moeller-sven.de](http://www.moeller-sven.de)

### Employment

- since 2022 **Junior research group leader**, *Universität Hamburg*, Germany.  
Emmy Noether Programme: *Vertex algebras associated with 2- and 4-dimensional conformal field theories*
- 2020–2021 **Postdoctoral research fellow**, *RIMS, Kyoto*, Japan.  
JSPS project: *Construction and classification of vertex operator algebras related to 2- and 4-dimensional conformal field theories*
- 2017–2020 **Assistant professor (non-tenure track)**, *Rutgers University*, USA.
- 2016–2017 **Postdoctoral research associate**, *Technische Universität Darmstadt*, Germany.
- 2013–2016 **Research associate**, *Technische Universität Darmstadt*, Germany.  
DFG project: *Infinite-dimensional Lie algebras in string theory*
- 2011 **Internship**, *German Electron Synchrotron (DESY)*, Hamburg, Germany.  
Summer student programme
- 2010 **Internship**, *GSI Helmholtz Centre for Heavy Ion Research*, Darmstadt, Germany.  
Summer student programme
- 2010–2013 **Teaching assistant**, *Technische Universität Darmstadt*, Germany.

### Education

- 2013–2016 **Ph.D. Mathematics**, *Technische Universität Darmstadt*, Germany, with distinction.  
Thesis project: “A Cyclic Orbifold Theory for Holomorphic Vertex Operator Algebras and Applications” (Advisor: Nils Scheithauer)
- 2010–2012 **M.Sc. Mathematics**, *Technische Universität Darmstadt*, Germany, with distinction.  
Master’s thesis: “On the Classification of Automorphic Products of Singular Weight”
- 2010–2012 **M.Sc. Physics**, *Technische Universität Darmstadt*, Germany, with distinction.  
Master’s thesis: “Pion-Pion Scattering and Shear Viscosity in the Nambu–Jona-Lasinio Model”
- 2009–2010 **Abroad studies**, *Lund University*, Sweden.  
ERASMUS student exchange programme

2007–2010 **B.Sc. Mathematics**, *Technische Universität Darmstadt*, Germany, with distinction.

2007–2010 **B.Sc. Physics**, *Technische Universität Darmstadt*, Germany, with distinction.

---

## Scholarships, Grants and Awards

2022–2027 **Research Grant**, *Emmy Noether Programme*, Deutsche Forschungsgemeinschaft (DFG, German Research Foundation).

2020–2023 **Research Grant**, *Grant-in-Aid KAKENHI 20F40018*, Japan Society for the Promotion of Science (JSPS).

2020–2022 **Fellowship**, *JSPS Postdoctoral Fellowship for Research in Japan*.

2018–2020 **Grant**, *AMS-Simons Travel Grant*.

2013–2016 **Doctoral scholarship**, *Studienstiftung des deutschen Volkes (German Academic Scholarship Foundation)*.

Financial and academic sponsoring

2011 **B.Sc.-Prize**, *Gerhard-Herzberg-Gesellschaft*.

“For the excellent performance shown in the bachelor’s studies”

2007–2012 **Scholarship**, *Studienstiftung des deutschen Volkes (German Academic Scholarship Foundation)*.

Financial and academic sponsoring

---

## Publications

[MS21] Sven Möller and Nils R. Scheithauer. A geometric classification of the holomorphic vertex operator algebras of central charge 24. 2021, submitted. (arXiv:2112.12291 [math.QA]).

[HM20] Gerald Höhn and Sven Möller. Systematic orbifold constructions of Schellekens’ vertex operator algebras from Niemeier lattices. 2020, submitted. (arXiv:2010.00849 [math.QA]).

[ELMS21] Jethro van Ekeren, Ching Hung Lam, Sven Möller, Hiroki Shimakura. Schellekens’ list and the very strange formula. *Adv. Math.*, 380:107567, 2021. (arXiv:2005.12248 [math.QA]).

[MS19] Sven Möller and Nils R. Scheithauer. Dimension formulae and generalised deep holes of the Leech lattice vertex operator algebra. *Ann. of Math.*, accepted. (arXiv:1910.04947 [math.QA]).

[Möl21] Sven Möller. Natural construction of ten Borcherds-Kac-Moody algebras associated with elements in  $M_{23}$ . *Comm. Math. Phys.*, 383(1):35–70, 2021. (arXiv:1905.09629 [math.QA]).

[Möl18] Sven Möller. Orbifold vertex operator algebras and the positivity condition. In *Research on algebraic combinatorics and representation theory of finite groups and vertex operator algebras*, number 2086 in RIMS Kôkyûroku, pages 163–171. Research Institute for Mathematical Sciences, 2018. (arXiv:1803.03702 [math.QA]).

- [EMS20b] Jethro van Ekeren, Sven Möller and Nils R. Scheithauer. Dimension formulae in genus zero and uniqueness of vertex operator algebras. *Int. Math. Res. Not.*, 2020(7):2145–2204, 2020. (arXiv:1704.00478 [math.QA]).
- [Möl16] Sven Möller. *A cyclic orbifold theory for holomorphic vertex operator algebras and applications*. Dissertation, Technische Universität Darmstadt, 2016. (arXiv:1611.09843 [math.QA]).
- [EMS20a] Jethro van Ekeren, Sven Möller and Nils R. Scheithauer. Construction and classification of holomorphic vertex operator algebras. *J. Reine Angew. Math.*, 759:61–99, 2020. (arXiv:1507.08142 [math.RT]).

---

## Research Visits

- Mar. 2022 IMPA thematic programme *Vertex and chiral algebras*, Rio de Janeiro, Brazil
- June 2019 Nils Scheithauer, Technische Universität Darmstadt, Germany
- Nov. 2018 Gerald Höhn, Kansas State University, USA
- Aug. 2018 Ching Hung Lam, Academia Sinica, Taiwan
- July 2018 RIMS research project *Vertex operator algebras and symmetries*, Kyoto, Japan
- June 2018 Nils Scheithauer, Technische Universität Darmstadt, Germany
- Sept. 2017 Gerald Höhn, Kansas State University, USA

---

## Invited Talks and Conferences

- Mar. 2022 *International Workshop on Representation Theory, Vertex and Chiral Algebras*, IMPA, Rio de Janeiro, Brazil
- Sept. 2021 *Conference on Vertex Algebras and Related Topics*, Technische Universität Darmstadt, Germany
- Sept. 2021 *MSJ Autumn Meeting 2021*, Chiba University, Japan
- July 2021 *Japan Europe Number Theory Exchange Seminar*
- Apr. 2021 *Rocky Mountain Representation Theory Seminar*, University of Colorado, Boulder, USA
- June 2020 *International Seminar on Automorphic Forms*, Technische Universität Darmstadt, Germany, ETH Zürich, Switzerland
- June 2020 *Oberseminar Geometrische Analysis und Zahlentheorie*, Universität Paderborn, Germany
- Mar. 2020 *Winter Seminar of the Darmstadt Algebra Group*, Manigod, France
- Feb. 2020 *Algebra and Number Theory Seminar*, University of Arizona, USA
- Oct. 2019 *AMS Sectional Meeting*, Binghamton University, USA
- Aug. 2019 *Workshop on Vertex Operator Algebras and Related Topics*, Chengdu, China
- June 2019 *Representation Theory XVI*, Dubrovnik, Croatia
- June 2019 *The Mathematical Foundations of Conformal Field Theory and Related Topics*, Chern Institute of Mathematics, Tianjin, China
- Feb. 2019 *Winter Seminar of the Darmstadt Algebra Group*, Manigod, France

- Nov. 2018 *Workshop on Vertex Algebras and Infinite-Dimensional Lie Algebras*, University of Split, Croatia
- Nov. 2018 *Algebra Seminar*, Kansas State University, USA
- July 2018 Participation: *Vertex Operator Algebras and Conformal Field Theory/Vertex Operator Algebras and Symmetries*, Research Institute for Mathematical Sciences, Kyoto, Japan
- June 2018 *Vertex Operator Algebras, Number Theory, and Related Topics: A Conference in Honor of Geoffrey Mason*, California State University, Sacramento, USA
- April 2018 *10<sup>th</sup> Seminar on Conformal Field Theory: A Conference on Vertex Operator Algebras and Related Topics*, Research Institute for Mathematical Sciences, Kyoto, Japan
- Feb. 2018 *Winter Seminar of the Darmstadt Algebra Group*, Manigod, France
- Dec. 2017 *Research on Algebraic Combinatorics and Representation Theory of Finite Groups and Vertex Operator Algebras*, Research Institute for Mathematical Sciences, Kyoto, Japan
- Sept. 2017 *Algebra Seminar*, Kansas State University, USA
- Jan. 2017 Participation: *Geometry and Representation Theory*, Erwin Schrödinger International Institute for Mathematical Physics, Vienna, Austria
- Sept. 2016 *Lie Group/Quantum Mathematics Seminar*, Rutgers University, USA
- June 2015 *4<sup>th</sup> Seminar on Conformal Field Theory*, Technische Universität Darmstadt, Germany
- Mar. 2015 Participation: *Characters of Representations and Modular Forms*, Max Planck Institute for Mathematics, Bonn, Germany
- June 2014 *Algebras, Groups and Geometries*, University of Tokyo, Japan
- May 2014 *Algebra & Representation Theory for Young Researchers*, University of Erlangen-Nuremberg, Germany

## Teaching Experience

### Lectures

- Spring 2021 Modular Forms
- Spring 2020 Introductory Linear Algebra
- Fall 2019 Theory of Numbers
- Fall 2019 Introduction to Real Analysis
- Spring 2019 Introduction to Mathematical Reasoning (2 sections)
- Fall 2018 Introduction to Mathematical Reasoning
- Spring 2018 Introduction to Mathematical Reasoning (2 sections)
- Fall 2017 Linear Algebra
- Spring 2016 Riemann Surfaces

### Seminars

- Fall 2015 Vertex Algebras

### Research Associate

- Spring 2017 Linear Algebra II  
Fall 2016 Linear Algebra I  
Fall 2015 Linear Algebra for Physicists I  
Spring 2015 Linear Algebra II

### Teaching Assistant

- Spring 2013 Integration Theory  
Spring 2013 Computational Physics  
Fall 2012 Complex Analysis  
Fall 2012 Ordinary Differential Equations  
Spring 2012 Quantum Theory and Statistical Physics for Teachers  
Fall 2011 Geometry for Teachers  
Spring 2011 Introduction to Stochastics  
Fall 2010 Introduction to Numerical Analysis

---

### Service

- Referee for Comm. Math. Phys., Transform. Groups, RIMS Kôkyûroku Bessatsu, Math. Z., J. Alg., J. London Math. Soc., Ann. Henri Poincaré, Adv. Math., zbMATH
- 2022 Co-organiser of workshop on *Modular Forms and Representation Theory*, Manigod, France
- 2018 Co-organiser of *Postdoc Colloquium*, Rutgers University, USA
- 2015-2017 Co-organiser of *Winter Seminar of the Darmstadt Algebra Group*, Manigod and La Plagne, France
- 2015 Co-organiser of summer school on *Drinfeld Modular Forms*, Manigod, France
- since 2014 Member of the selection committee on admission seminars of the *Studienstiftung des deutschen Volkes* (German Academic Scholarship Foundation)

---

### Memberships

- DMV German Mathematical Society

---

### Languages

- |         |               |           |              |
|---------|---------------|-----------|--------------|
| German  | mother tongue | Danish    | intermediate |
| English | fluent        | Norwegian | intermediate |
| Swedish | fluent        | Russian   | beginner     |
| French  | fluent        | Japanese  | beginner     |
| Latin   | knowledge     |           |              |