

## 1. CURRICULUM VITAE

### **Prof. Simon Lentner.**

Department of Mathematics, University of Hamburg  
Bundesstraße 55, 20146 Hamburg  
Phone: +49 (0)40 42838 5178  
EMail: Simon.Lentner@uni-hamburg.de  
Homepage: simon.lentner.net

### **Personal Data.**

---

Date of birth 8. June 1985  
Place of birth Rosenheim, Germany  
Parents Wolfgang Lentner, Maria Noichl  
Children Jonathan (6)  
Languages German, English

---

### **Scientific postdoctoral occupations.**

---

since 10/2016 Junior Professor for Algebra & Number Theory at University of Hamburg  
since 06/2016 Elected Fellow of the Young Academy of Science (Junge Akademie)  
10/2015 - 9/2016 Lebedev Physical Institute, Moscow (Prof. Feigin, Prof. Semikhatov)  
Research grant (PRIME, funded by EU and DAAD).  
4/2013 - 9/2015 Postdoctoral assistant at University of Hamburg (Prof. Schweigert)  
Associate Member of the DFG Research Training Group 1670  
“Mathematics inspired by string theory and quantum field theory”

---

*Teaching experience since 2010, please see below*

### **University Education.**

---

10/2008 - 12/2012 Doctorate in Mathematics at LMU Munich  
Thesis: “Orbifoldizing Hopf- and Nichols-Algebras“  
21.12.2012 Degree Dr. (magna cum laude)  
10/2004 - 2/2008 Study of Mathematics (Diploma) at LMU Munich  
Thesis: “Vertex Algebras Constructed from Hopf Algebra Structures“  
Degree: Dipl. Math. (highest grade 1)

---

*Advisor for both Prof. Schottenloher, referees Prof. Schauenburg  
respectively Prof. Schweigert and Prof. Schneider.*

---

**Work experience, scholarships and grants as a PhD student.**

---

7/2011 - 3/2013	Cofounder and leading researcher of the university spin-off company PerfectPattern GmbH (with currently 10 employees) Technology transfer, budget and personnel responsibilities
10/2013	Author of 3 filed patents concerning combinatorial optimization. Main role in acquiring 3 grants: (two including myself)
4/2013 - now	University part of larger project (KMU-Innovativ, BMBF)
7/2012 - 6/2014	Three university positions (FLÜGGE, StMWFK Bavaria)
7/2011 - 6/2012	Three scholarships plus founding costs (EXIST, BMWi)
12/2008 - 6/2011	Doctorate Scholarship from "Studienstiftung des deutschen Volkes"
4/2010 - 9/2010	Teaching Assistant at the LMU Munich

---

*until 9/2011 two own lectures and one seminar, please see teaching experience*

---

**Work experience as a Diploma student.**

---

2003 - 2008	Student assistant in teaching at LMU Munich
2004 - 2007	Work for two Rosenheim youth centers (2 days/week) IT-administration, tutoring, support for employment seeking.

---

---

**Voluntary Activities.**

---

2008-2013	Participant in the LMU-Project "MobilesMatheLabor" Projects with school classes and Math Mountain Camps
2000, 2003, 2008	Organization of a winter school for talented high school students.
2005-2008	Deputy chairman for Jusos Upper Bavaria Staff- and budget responsibilities, public relations and conference orga Inner-party political processes, workgroup European Union
2003-2008	Head of the Jusos Rosenheim (youth organization of the SPD party)

---

---

**School Education.**

---

25.6.2004	High school certificate: Abitur
2002-2004	University attendance during high school Course credits (Scheine) in algebra I+II and two algebra seminars
2001-2002	Exchange student, St. Cloud High school, Florida, USA Participation in competitions such as the Mathematic Olympics (DEMO 2001)
1996-2004	Ignaz-Günther-Gymnasium, Rosenheim (musical branch)
1992-1996	Astrid Lindgren elementary school, Rosenheim

---

## 2. PUBLICATIONS

- S. Lentner, T. Ohrmann: Factorizable R-matrices for small quantum groups, SIGMA 13 (2017), arXiv:1612.07960.
- S. Lentner, J. Priel: Three natural subgroups of the Brauer-Picard group of a Hopf algebra with applications, Bull. Belg. Math. Soc. Simon Stevin 24 (2017), p. 1-34. arXiv:1702.05133.
- M. Cuntz, S. Lentner: A simplicial complex of Nichols algebras, Mathematische Zeitschrift 4 (2015) p. 1-37. arXiv:1503.08117.
- S. Lentner, J. Priel: A decomposition of the Brauer-Picard group of the representation category of a finite group, Preprint (2015) accepted for Algebra and Number Theory arXiv:1506.07832.
- S. Lentner, J.Priel: On monoidal autoequivalences of the category of Yetter-Drinfeld modules over a group: The lazy case, Preprint(2015) to accepted for Journal of Algebra arXiv:1511.03871.
- S. Lentner, D. Nett: New R-matrices for small quantum groups, Algebras and Representation Theory 18/6 (2015), p. 1649-1673. arXiv:1409.5824.
- S. Lentner: A Frobenius homomorphism for Lusztig's quantum groups over arbitrary roots of unity, Communications in Contemporary Mathematics 18/3 (2015), arXiv:1406.0865.
- S. Lentner, A. Lochmann: Factorization Of Graded Traces On Nichols Algebras, Axioms 6/4, Special Issue "Hopf Algebras, Quantum Groups and Yang-Baxter Equations" (2017), arXiv:1403.4287.
- A. Barvels, S. Lentner, C. Schweigert: Partially Dualized Hopf Algebras Have Equivalent Yetter-Drinfel'd Modules, Journal of Algebra 430 (2015) p. 303-342. arXiv:1402.2214.
- S. Lentner: Root Systems In Finite Symplectic Vector Space, Communications in Algebra, 43 (2015) p. 4446-4470. arXiv:1307.7151
- S. Lentner: New Large-Rank Nichols Algebras Over Nonabelian Groups With Commutator Subgroup  $\mathbb{Z}_2$ , Journal of Algebra 419C (2014) p. 1-33. arXiv:1306.5684

**Preprints.** All preprints can be retrieved at [http://arxiv.org/a/lentner\\_s\\_1](http://arxiv.org/a/lentner_s_1)

S. Lentner, S. Mierach, C. Schweigert, Y. Sommerhäuser: Hochschild Cohomology and the Modular Group, Preprint (2017), arXiv:1707.04032.

I. Flandoli, S. Lentner: Logarithmic conformal field theories of type  $B_n$ ,  $\ell = 4$  and symplectic fermions Preprint (2017), arXiv:1706.07994.

S. Lentner: Quantum groups and Nichols algebras acting on conformal field theories, Preprint (2017), arXiv: 1702.06431.

S. Lentner, K. Vocke: Constructing new Borel subalgebras of quantum groups with a non-degeneracy property, Preprint (2017), arXiv: 1702.06223.

S. Lentner: The unrolled quantum group inside Lusztig's quantum group of divided powers, Preprint (2017), arXiv:1702.05164.

E. Kraus, S. Lentner: Nash Equilibria And Partition Functions Of Games With Many Dependent Players, Preprint (2015) arXiv:1504.03965.

S. Lentner: Quantum affine algebras at small root of unity, Preprint (2014) arXiv:1411.2959.

S. Lentner, D. Nett: A theorem on roots of unity and a combinatorial principle, Preprint (2014) arXiv:1409.5822.

### **Submitted patents in 2013.**

- 10 2013 101 604.9 Combinatorial optimization of printing layouts
- 10 2013 103 167.6 Combinatorial optimization of wood cutting (joint with Prof. Schottenloher, Dr. Paleani, R. Meißner, L. Lentner).
- 10 2013 103 169.2 Combinatorial optimization of cutting processes (joint with Prof. Schottenloher, Dr. Paleani, R. Meißner, L. Lentner).

### **Other scientific works.**

- Different forms of quantum groups and the Frobenius homomorphism, Conference Proceedings, Oberwolfach Report 10 (2015).

- Folding of Nichols algebras and quantum groups, Conference Proceedings, Oberwolfach Report 20 (2014).
- Orbifoldizing Hopf- And Nichols Algebras, Dissertation, LMU Munich (2012).
- Nichols Algebras Over Nilpotent Groups, Conference Proceedings, Oberwolfach Report 43 (2010).
- Vertex Algebras Constructed From Hopf Algebra Structures, Diploma Thesis, LMU Munich (2007).

### 3. CONFERENCE TALKS

- Quantum groups and Nichols algebras acting by screening operators, 10. December 2017, Affine, Vertex and W-algebras, Rome.
- Quantum groups and logarithmic conformal field theories, 23. September 2015, Annual meeting of the German Mathematical Society (DMV), Hamburg.
- A decomposition of the Brauer Picard group, 5. June 2015, New trends in Hopf algebras and tensor categories, Brussels.
- Quantum groups a small root of unity, 6. March 2015, Quantum 2015, Córdoba, Argentina.
- Different types of Quantum groups and the Frobenius homomorphism, 20. April 2015, Oberwolfach miniworkshop “Coideal Subalgebras of Quantum groups”.
- Construction of large rank Nichols algebras, 25. August 2014, Summer school “Conformal Field Theory and Nichols Algebras”, Raischholzhausen/Marburg.
- Folding Nichols algebras and quantum groups, 17. April 2014, Oberwolfach miniworkshop “Infinite-dimensional Hopf algebras”.
- Partially dualized Hopf algebras have equivalent Yetter-Drinfeld modules, 25. March 2014, Annual conference of the DFG priority program SPP 1388 “Representation Theory“, Soltau.
- Nichols Algebras Over Nilpotent Groups, 30. September 2010, Oberwolfach Workshop “Deformations in Mathematical Physics”.

#### **Other external talks.**

- Quantum Groups and Nichols Algebras Acting on Conformal Field Theories 12. September 2017, Algebra/Topology Seminar Albany, NY.
- Nichols algebras and conformal field theory 23. February 2016, Research Colloquium, Buenos Aires.
- From Quantum symmetries to logarithmic conformal field theories, 23. October 2015, Quantum field theory seminar, Lebedev Institute Moscow, Russia.
- BiGalois objects and the Brauer Picard group, 6. May 2015, Colloquium University of Vienna

- Lusztig's algebra of divided powers and logarithmic conformal field theory, 13. March 2015, Universidad de Buenos Aires, Argentina.
- Automorphisms of Root Systems and Quantum groups, 30. June 2014, Oberseminar Algebra and Algebraic Combinatorics, University Hannover.
- Partial Dualization Of Hopf Algebras And Reflection Of Quantum Groups, 26. June 2014, Colloquium University Göttingen.
- Partial Dualization Of Hopf Algebras, 21. November 2013. Seminar Combinatorics und Algebra, Philipps-University Marburg.
- Diagram folding and Nichols algebras over nonabelian groups, 29. May 2013. Seminar Combinatorics and Algebra, Philipps-University Marburg.
- On new large rank Nichols algebras and pointed Hopf algebras with nonabelian coradical, 16. May 2013. "Seminar Bremen - Hamburg - Kiel", Hamburg.
- Innovative algorithms for combinatorial optimization in industry processes, 2. May 2012. University of applied science, Munich.
- Nichols Algebras Over Nilpotent Groups, 31. May 2011. Research Seminar Algebra and Number Theory, University Hamburg.

#### 4. TEACHING EXPERIENCE

##### **Independently taught classes.**

WS 2017/18	Lecture “Elliptic curves and modular forms”
SS 2017	Lecture: “Complex Analysis” (no teaching in Moscow)
SS 2015	Seminar: “Root systems and Lie algebras”
WS 2014/15	Seminar: “Representation theory of finite groups”
WS 2014/15	Preparation Course: “Master Mathematical Physics”
WS 2013/14	Preparation Course: “Master Mathematical Physics”
SS 2011	Lecture: “Finite groups and their Nichols Algebras”
WS 2010/11	Seminar: “Game Theory with Many Players and Statistical Physics”
SS 2010	Lecture: “Hopf Algebras Generating Fusion Rings And Topological Invariants”

##### **Coordination of tutorial classes and seminars as an assistant.**

WS 2014/15	“Advanced algebra II: Homological algebra and representation theory”
SS 2014	“Mathematics 4 for Physicists”
WS 2013/14	“Mathematics 3 for Physicists and Geoscientists”
SS 2013	“Mathematics 2 for Physicists and Geoscientists”
SS 2013	“Representation Theory of groups and Lie algebras”
SS 2012/13	“Thermodynamical Quantum Algorithms”
SS 2011/12	“Topological Field Theory And Topological Invariants”
SS 2010	“Quantum Field Theory in Curved Spacetime”

##### **Student theses supervision.**

- Ilaria Flandoli (PhD), ongoing. “Logarithmic conformal field theory, Nichols algebras and Liouville theory”.
- Tobias Ohrmann (PhD, joint with Prof. Schweigert), ongoing. “Factorizable (quasi-)quantum groups.”
- Ilaria Flandoli (Master in mathematical physics), 21.7.2017. “Logarithmic conformal field theory of type  $B_n, \ell = 4$  and symplectic fermions.”

Participation as member of the DFG Research Training Group 1670 (mostly):

- Jan Priel (PhD thesis, Prof. Schweigert), finished 11.6.2016. Determine the automorphism groups of nonabelian Dijkgraaf-Witten theories.
- Daniel Nett (PhD thesis, Prof. Schweigert), finished 16.3.2015. “New R-matrices for small quantum groups”.
- Alexander Barvels (PhD thesis, Prof. Schweigert), finished 2.7.2014. “Two constructions in monoidal categories: Equivariantly extended Drinfel’d Centers and Partially dualized Hopf Algebras”.

- Lisa Kraus (Diploma thesis, Prof. Schottenloher), finished 7.12.2011.  
“Game-Theory of the Stock Market and Statistical Physics”.
- Karolina Vocke (Diploma thesis, Prof. Schottenloher), finished 24.12.2010.  
“Anyonmodels from Hopf algebras”.