

Lucia Morotti

CV

Name: Lucia Morotti
Address: Mathematisches Institut
Heinrich-Heine-Universität Düsseldorf
Universitätsstr. 1
40225 Düsseldorf
Phone: +49 211 81 13194
Email: morotti@math.uni-hannover.de
Date of birth: 01.09.1987
Place of birth: Bergamo, Italy
Nationality: Italian

Education:

07.2006 Esame di Stato conclusivo degli studi secondari superiori (high school concluding exam) at “Liceo scientifico statale F. Lussana”, Bergamo, Italy
10.2006-07.2009 B.Sc. in mathematics at “Università degli studi di Pavia”, Italy
Grade: 110 e lode
09.2009-06.2011 M.Sc. in mathematics at “University of Copenhagen”, Denmark
Grade: 12
M.Sc.thesis: On p -vanishing and sign classes of the symmetric group, Applications of the Murnaghan-Nakayama formula
Supervisor: Prof. J.B. Olsson
08.2011-08.2014 Ph.D. in mathematics at “RWTH Aachen University”, Germany
Grade: summa cum laude
Ph.D. thesis: Explicit construction of universal sampling sets for finite abelian and symmetric groups
Supervisors: Prof. H. Führ, Prof. G. Hiß
01.2022 Habilitation at “Leibniz Universität Hannover”, Germany
Habilitation thesis: Irreducible tensor products for symmetric and alternating groups in small characteristics

Awards and scholarships:

- INdAM scholarship for mathematics students, 2006-2008
- Borchers-Plakette, RWTH Aachen University, 2015

Employment history:

08.2011-08.2014 Ph.d. student at “RWTH Aachen University”, Germany
 08.2014-09.2015 Postdoc at “RWTH Aachen University”, Germany
 10.2015-09.2022 Postdoc at “Leibniz Universität Hannover”, Germany
 10.2022- Postdoc at “Heinrich-Heine-Universität Düsseldorf”, Germany

Teaching experience:

Winter 2014/15 Exercises for Topology
 Winter 2014/15 Begleitpraktikum I
 Summer 2015 Begleitpraktikum II
 Winter 2015/16 Exercises for Linear algebra I
 Summer 2016 Exercises for Mathematics for engineers II
 Winter 2016/17 Exercises for Linear algebra I
 Summer 2017 Exercises for Mathematics for engineers II
 Winter 2017/18 Exercises for Linear algebra I
 Summer 2021 Exercises for Discrete Structures
 Winter 2021/22 Cryptography
 Summer 2022 Exercises for Discrete Structures
 Winter 2022/23 Exercises for Linear algebra I

Research grants:

04.2018-03.2021 DFG-grant MO 3377/1-1 and MO 3377/1-2 for project
 “Irreducible tensor products of representations of symmetric and related groups”, total 272.200 €

Research stays:

08.2017 Universität Stuttgart
 04.-05.2018 MSRI, Berkley, USA
 08.2018 Universität Stuttgart
 11.-12.2018 University of Oregon, Eugene, USA
 06.-07.2019 University of Oregon, Eugene, USA
 01.2020 Isaac Newton Institute for Mathematical Sciences, Cambridge, UK
 03.2022 Queen Mary University of London

05.-06.2022 Isaac Newton Institute for Mathematical Sciences, Cambridge, UK

Talks:

- 06.04.2011 *p*-vanishing and sign classes of S_n , Colloquium of the Experimental and Constructive Algebra Research Training Group, RWTH Aachen University (invited)
- 06.11.2012 *Universal sampling sets over elementary abelian p-groups*, Colloquium of the Experimental and Constructive Algebra Research Training Group, RWTH Aachen University
- 20.05.2014 *On multisets of hooks lengths of partitions*, Colloquium of the Experimental and Constructive Algebra Research Training Group, RWTH Aachen University
- 06.06.2014 *Results on representation theory of symmetric groups*, Groups and Representations Seminar, Technische Universität Kaiserslautern (invited)
- 26.01.2015 *Sign conjugacy classes of the symmetric groups*, Algebra and Algebraic Combinatorics seminar, Leibniz Universität Hannover (invited)
- 26.02.2015 *Sign conjugacy classes of the symmetric groups*, Group Theory Seminar, EPFL Lausanne (invited)
- 05.04.2016 *Non-zero values in blocks of symmetric groups*, 76th Séminaire Lotharingien de Combinatoire
- 14.11.2016 *Irreducible tensor products of representations of symmetric groups*, Algebra and Algebraic Combinatorics seminar, Leibniz Universität Hannover
- 10.12.2016 *Irreducible tensor products of representations of symmetric groups*, Nikolaus conference 2016, RWTH Aachen University
- 31.01.2017 *Irreducible tensor products of representations of symmetric groups*, Colloquium of the Experimental and Constructive Algebra Research Training Group, RWTH Aachen University (invited)
- 08.08.2017 *Irreducible tensor products of representations of symmetric and alternating groups*, Seminar of the Institute for Algebra and Number Theory, Universität Stuttgart (invited)
- 12.07.2018 *Irreducible restrictions of representations of symmetric groups*, Algebra and Algebraic Combinatorics seminar, Leibniz Universität Hannover
- 21.08.2018 *Irreducible restrictions of representations of symmetric groups*, Seminar of the Institute for Algebra and Number Theory, Universität Stuttgart (invited)

- 15.09.2018 *Irreducible tensor products of representations of alternating groups*, Darstellungstheoretage 2018, Leibniz Universität Hannover
- 29.11.2018 *Irreducible tensor products of representations of symmetric and related groups*, Algebra Seminar, University of Oregon (invited)
- 24.01.2019 *Irreducible tensor products of representations of symmetric and related groups*, Algebra and Algebraic Combinatorics seminar, Leibniz Universität Hannover
- 25.03.2019 *Irreducible restrictions of representations of symmetric and alternating groups*, Representations of Finite Groups, Oberwolfach
- 03.09.2019 *Non-zero values in blocks of symmetric groups*, XXI Congresso dell'Unione Matematica Italiana, Università degli studi di Pavia (invited)
- 09.12.2019 *Irreducible tensor products of representations of symmetric and related groups*, Women in Algebra and Symbolic Computations, Bad Dürkheim
- 21.01.2020 *Irreducible restrictions of representations of symmetric and alternating groups*, Groups, representations and applications: new perspectives, Isaac Newton Institute for Mathematical Sciences (invited)
- 28.02.2020 *Irreducible tensor products of representations of symmetric and related groups*, Kronecker, Plethysm, and Sylow Branching Coefficients and their Applications to Complexity Theory, Oberwolfach (invited)
- 19.11.2020 *Self-extensions of irreducible modules over symmetric groups*, Algebra and Algebraic Combinatorics seminar, Leibniz Universität Hannover, online
- 25.03.2021 *Decomposition matrices for spin representations of symmetric groups*, London Algebra Colloquium, online (invited)
- 17.05.2021 *Irreducible tensor products of representations of symmetric and related groups*, Mathematics Seminar, Aarhus University, online (invited)
- 16.11.2021 *Decomposition of spin representations of symmetric groups in characteristic 2*, Birmingham Algebra Seminar, online (invited)
- 29.11.2021 *Irreducible reductions of spin representations of symmetric groups in characteristic 3*, Women in Algebra and Symbolic Computations II, Bad Dürkheim (invited)
- 03.05.2022 *Homogeneous reductions of spin representations*, Mathematical-Physical Colloquium, Leibniz Universität Hannover

- 20.05.2022 *Homogeneous reductions of spin representations*, Groups in Galway meets the Irish Geometry Conference, National University of Ireland Galway (invited)
- 27.05.2022 *Homogeneous reductions of spin representations in characteristic 3*, Algebra and Number Theory seminar, Queen Mary University of London (invited)
- 10.06.2022 *Decomposition of spin representations of symmetric groups in characteristic 2*, Finite Groups, Isaac Newton Institute for Mathematical Sciences (invited)
- 05.-07.09.2022 *Representation theory of symmetric groups*, online mini course, IKIU Summer School on group representation theory, Imam Khomeini International University (invited)
- 13.10.2022 *Decomposition of 2-parts spin representations of symmetric groups*, Norddeutsches Gruppentheorie-Kolloquium 2022, Heinrich-Heine-Universität Düsseldorf (invited)

Organised conferences:

- 08.-09.07.2022 (with C. Bowman, M. Cuntz, U. Derenthal, T. Holm and B. Sambale) Colloquium and Conference in Memory of Christine Bessenrodt

Publication list:

Articles:

- [1] L. Morotti, On multisets of hook lengths of partitions, *Discrete Math.* **313** (2013), 2792–2797.
- [2] L. Morotti, Vanishing classes for p -singular irreducible characters of symmetric groups, *J. Algebra* **422** (2015), 334–340.
- [3] L. Morotti, p -vanishing conjugacy classes of symmetric groups, *J. Algebra* **450** (2016), 349–383.
- [4] L. Morotti, Sign conjugacy classes of the symmetric groups, *Electron. J. Combin.* **22** (2015), P3.12 (23 pp).
- [5] L. Morotti, Sign conjugacy classes of the alternating groups, *Comm. Algebra* **46** (2018), 1066–1079.
- [6] L. Morotti, Explicit universal sampling sets in finite vector spaces, *Appl. Comput. Harmon. Anal.* **43** (2017), 354–369.
- [7] L. Morotti, On the number of non-zero character values in generalized blocks of symmetric groups, *J. Algebraic Combin.* **47** (2018), 233–239.
- [8] L. Morotti, Irreducible tensor products for symmetric groups in characteristic 2, *Proc. Lond. Math. Soc. (3)* **116** (2018), 1553–1598.

- [9] L. Morotti, Irreducible tensor products for alternating groups in characteristic 5, *Algebr. Represent. Theory* **24** (2021), 203–229.
- [10] A. Kleshchev, L. Morotti, P.H. Tiep, Irreducible restrictions of representations of symmetric groups in small characteristics: reduction theorems, *Math. Z.* **293** (2019), 677–723.
- [11] L. Morotti, Irreducible tensor products for alternating groups in characteristics 2 and 3, *J. Pure Appl. Algebra* **224** (2020), 106426 (32 pp).
- [12] L. Morotti, On divisibility by primes in columns of character tables of symmetric groups, *Arch. Math. (Basel)* **114** (2020), 361–365.
- [13] A. Kleshchev, L. Morotti, P.H. Tiep, Irreducible restrictions of representations of alternating groups in small characteristics: reduction theorems, *Represent. Theory* **24** (2020), 115–150.
- [14] A. Kleshchev, L. Morotti, P.H. Tiep, Lower bounds for dimensions of irreducible representations of symmetric groups, *Proc. Amer. Math. Soc.* **148** (2020), 1439–1445.
- [15] A. Kleshchev, L. Morotti, P.H. Tiep, Irreducible restrictions of representations of symmetric and alternating groups in small characteristics, *Adv. Math.* **369** (2020), 107184 (66 pp).
- [16] L. Morotti, Composition factors of 2-parts spin representations of symmetric groups, *Algebr. Comb.* **3** (2020), 1283–1291.
- [17] L. Morotti, Irreducible tensor products of representations of covering groups of symmetric and alternating groups, *Represent. Theory* **25** (2021), 543–593.
- [18] H. Geranios, A. Kleshchev, L. Morotti, On self-extensions of irreducible modules over symmetric groups, *Trans. Amer. Math. Soc.* **375** (2022), 2627–2676.
- [19] L. Morotti, H.P. Tong-Viet, Proportions of vanishing elements in finite groups, *Israel J. Math.* **246** (2021), 441–457.

Preprints:

- [20] L. Morotti, Irreducible tensor products for alternating groups in characteristic 2, arXiv:2105.03348 (37 pp).
- [21] M. Fayers, L. Morotti, Irreducible spin representations of symmetric and alternating groups which remain irreducible in characteristic 3, arXiv:2208.05207 (28 pp).
- [22] M.L. Lewis, L. Morotti, H.P. Tong-Viet, Group elements whose character values are roots of unity, arXiv:2209.08089 (11pp).