

Johannes Cuno

Curriculum Vitae

PERSONAL DETAILS

<i>Institution</i>	Ludwigsburg University of Education, Institute of Mathematics II
<i>Address</i>	Reuteallee 46, 71634 Ludwigsburg, Germany
<i>E-Mail</i>	johannes.cuno@ph-ludwigsburg.de

RESEARCH INTERESTS

My original research interests are in group theory. Moreover, I wrote papers on graph theory and Markov chains. Inspired by my environment in Ludwigsburg the educational aspects of mathematics are coming more and more into focus. So I work on questions related to fostering functional thinking at school, but also on the development of digital tools for university teaching.

EDUCATION AND PROFESSIONAL EXPERIENCE

Senior Lecturer (“Akademischer Oberrat”) <i>PH Ludwigsburg, Germany</i>	2024 – now
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Lecturer (“Akademischer Rat”) <i>PH Ludwigsburg, Germany</i>	2018 – 2024
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Employment as Postdoc with ...	2015 – 2018
01/09/2017 – 31/08/2018 Anna Erschler, <i>École normale supérieure, Paris, France</i>	
01/06/2016 – 31/07/2017 Vadim Kaimanovich, <i>University of Ottawa, Canada</i>	
15/10/2015 – 14/05/2016 Wolfgang Woess, <i>TU Graz, Austria</i>	

PhD Programme in Mathematics (“Promotionsstudium”) <i>TU Graz, Austria</i>	2011 – 2015
<i>Degree</i> Dr. techn. (under supervision of Wolfgang Woess)	
04/01/2014 – 01/03/2014 Participant in the Geowalks Trimester, <i>IHP, Paris, France</i>	
14/01/2013 – 12/07/2013 Visiting Graduate Student with Tim Riley, <i>Cornell University, Ithaca, NY, USA</i>	

Master’s Programme in Mathematics (“Diplomstudium”) <i>Goethe University, Frankfurt am Main, Germany</i>	2005 – 2011
<i>Degree</i> Dipl.-Math. (under supervision of Robert Bieri)	

Teacher Education Programme (“Lehramtsstudium”) <i>Goethe University, Frankfurt am Main, Germany</i>	since 2001
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When I came to university, I wanted to become a school teacher for Mathematics and Latin. Teaching was, and still is, a passion of mine. But, after a while, I found myself surrounded by mathematical structures, by challenging problems and elegant proofs. In light of this beauty, I decided to postpone my career as a teacher and to delve deeper into mathematics.

TEACHING EXPERIENCE

Various Course Formats (Lectures, ...)

PH Ludwigsburg, Germany

Winter 25/26 MAT 451 Stochastics MAT 511 Modelling and Simulation MAT 704 Markov Chains MAT 800 Preliminary Course in Maths + 4 hrs per week Recitation Classes	Summer 23 MAT 462 School Maths from Higher POV MAT 511 Modelling and Simulation MAT 704 Markov Chains MAT 780 Group Theory + 2 hrs per week Recitation Classes	Winter 20/21 MAT 411 Introduction MAT 706 Combinatorics MAT 709 Algebra + 8 hrs per week Recitation Classes
Summer 25 MAT 511 Modelling and Simulation MAT 706 Combinatorics MAT 780 Group Theory MAT 800 Preliminary Course in Maths + 6 hrs per week Recitation Classes	Winter 22/23 MAT 431 Arithmetic and Algebra MAT 511 Modelling and Simulation MAT 708 Mathematik of the Infinite + 2 hrs per week Recitation Classes	Summer 20 MAT 411 Introduction MAT 705 Elementary Number Theory MAT 707 Markov Chains + 8 hrs per week Recitation Classes
Winter 24/25 MAT 451 Stochastics MAT 511 Modelling and Simulation MAT 704 Markov Chains MAT 800 Preliminary Course in Maths + 4 hrs per week Recitation Classes	Summer 22 MAT 462 School Maths from Higher POV MAT 511 Modelling and Simulation MAT 704 Markov Chains MAT 780 Group Theory + 5 hrs per week Recitation Classes	Winter 19/20 MAT 411 Introduction MAT 706 Combinatorics + 10 hrs per week Recitation Classes
Summer 24 MAT 462 School Maths from Higher POV MAT 511 Modelling and Simulation MAT 702 Formal Languages MAT 780 Group Theory MAT 790 Typesetting with L ^A T _E X + 6 hrs per week Recitation Classes	Winter 21/22 MAT 431 Arithmetic and Algebra MAT 454 PS "Charming Proofs" MAT 511 Modelling and Simulation MAT 706 Combinatorics + 6 hrs per week Recitation Classes	Summer 19 MAT 703 Topology MAT 709 Algebra + 12 hrs per week Recitation Classes
Winter 23/24 MAT 451 Stochastics MAT 462 School Maths from Higher POV MAT 511 Modelling and Simulation MAT 702 Number Theory + 4 hrs per week Recitation Classes	Summer 21 MAT 411 Introduction MAT 704 Markov Chains + 10 hrs per week Recitation Classes	Winter 18/19 MAT 705 Elementary Number Theory + 14 hrs per week Recitation Classes

Theses. I am serving as a supervisor for both Bachelor's and Master's theses in Mathematics. Until now I have supervised 29 Bachelor's theses as examiner as well as 19 Master's theses as second examiner. You find the list of topics on my personal homepage in the section "Betreuung von Schulpraktika und Abschlussarbeiten" under the item "Abschlussarbeiten".

Practical School Training. According to BW LVVO §2 (7), a state regulation in Baden-Württemberg, I regularly supervise students during their practical school training. At the moment, I am doing so at Matern-Feuerbacher-Realschule in Großbottwar. For this activity the legislator estimates a workload of 4 hours per week during the lecture period.

Lectures

University of Ottawa, Canada

Winter 17	MAT 1341 D Introduction to Linear Algebra
Autumn 16	MAT 1341 F Introduction to Linear Algebra

Recitation Classes ("Übungsgruppen")

TU Graz, Austria

Winter 14/15	Discrete Mathematics	Lecture: Franz Lehner
Summer 14	Linear Algebra II	Lecture: Franz Lehner
Winter 13/14	Linear Algebra I	Lecture: Wolfgang Woess
Winter 12/13	Mathematics A for Electrical Engineers	Lecture: Wolfgang Woess
Summer 12	Linear Algebra II	Lecture: Wolfgang Woess
Winter 11/12	Linear Algebra I	Lecture: Wolfgang Woess

Recitation Classes (“Übungsgruppen”)

Goethe University, Frankfurt am Main, Germany

Summer 09	Formal Languages and Computability	Lecture: Detlef Wotschke
Summer 08	Introduction to Topology	Lecture: Wolfgang Metzler
Winter 06/07	Introduction to Algebra and Number Theory	Lecture: Robert Bieri
Summer 06	Linear Algebra II	Lecture: Robert Bieri
Winter 05/06	Linear Algebra I	Lecture: Robert Bieri
Summer 05	Analysis for Computer Scientists	Lecture: Anton Wakolbinger
Winter 04/05	Mathematics I for Teacher Students: Number Systems	Lecture: Robert Bieri
Winter 03/04	Probability Theory for Computer Scientists	Lecture: Anton Wakolbinger

PUBLICATIONS

Contributions to Mathematics Education

1. Ute Sproesser and Johannes Cuno: Secondary mathematics teachers’ beliefs of tasks related to functional thinking. *PME 47 Conf. Proc.*, vol. 1, 2024, 219.

Contributions to Mathematics

5. Johannes Cuno and Gerald Williams: A class of digraph groups defined by balanced presentations. *J. Pure Appl. Algebra* **224** (8), 2020, № 106342.
4. Johannes Cuno and Ecaterina Sava-Huss: Random walks on Baumslag–Solitar groups. *Israel J. Math.* **228** (2), 2018, 627 – 663.
3. Johannes Cuno and Jörg Lehnert: The Tits alternative for non-spherical triangles of groups. *Trans. Lond. Math. Soc.* **2** (1), 2015, 93 – 124.
2. Tetiana Boiko, Johannes Cuno, Wilfried Imrich, Florian Lehner, and Christiaan E. van de Woestijne: The Cartesian product of graphs with loops. *Ars Math. Contemp.* **11** (1), 2016, 1 – 9.
1. Johannes Cuno, Wilfried Imrich, and Florian Lehner: Distinguishing graphs with infinite motion and nonlinear growth. *Ars Math. Contemp.* **7** (1), 2014, 201 – 213.

SELECTED TALKS

Audiofeedback – From the idea to a prototype and first test runs

Different versions of this talk have been given at the following occasions:

- 14/05/2025 Colloquium of the Institute of Mathematics II, PH Ludwigsburg, Germany
- 11/01/2023 Colloquium of the Institute of Mathematics II, PH Ludwigsburg, Germany

Three reasons to look forward to mathematics

Different versions of this talk have been given at the following occasions:

- 13/10/2022 Welcome Week, PH Ludwigsburg, Germany
- 10/10/2019 Welcome Week, PH Ludwigsburg, Germany

The golden ratio and the so called Fibonacci sequence

This talk has been given at the following occasion:

- 18/01/2019 Workshop on Fibonacci, PH Ludwigsburg, Germany
Video recording available on <https://www.youtube.com/watch?v=KMtNXyl9GwU>

How not to hang a picture on a wall

This talk has been given at the following occasion:

26/07/2017 Guest Talk at the Undergraduate Student Seminar, *University of Ottawa, Canada*

Baumslag–Solitar groups and around

Different versions of this talk have been given at the following occasions:

25/09/2017 Réunion de rentrée de l'équipe «Algèbre et géométrie», *ENS, Paris, France*

02/11/2016 Analysis Seminar, *University of Ottawa, Canada*

SQ-universality for polygonal products of one-relator groups

This talk has been given at the following occasion:

30/01/2015 Advanced Topics in Discrete Mathematics, *TU Graz, Austria*

Free groups and the Hanna Neumann conjecture – A picture book

Different versions of this talk have been given at the following occasions:

31/03/2017 Analysis Seminar, *University of Ottawa, Canada*

23/09/2014 Mathematics Seminar, *University of Essex, Colchester, UK*

12/05/2014 Structure Theory Seminar, *TU Graz, Austria*

04/02/2014 Student Seminar (Geowalks), *IHP, Paris, France*

30/04/2013 The Olivetti Club, *Cornell University, Ithaca, NY, USA*

Random walks on Baumslag–Solitar groups

Different versions of this talk have been given at the following occasions:

09/04/2018 Séminaire GAN, *University of Paris-Sud, Orsay, France*

20/02/2018 Group Theory Seminar, *ENS, Paris, France*

10/12/2015 Random Walks and Harmonic Functions on Groups, *CIB, Lausanne, Switzerland*

12/12/2014 Doctoral School Seminar, *TU Graz, Austria*

05/06/2014 Groups, Graphs, and Random Walks, *Palazzone di Cortona, Italy*

23/09/2013 18th ÖMG–DMV Congress, *University of Innsbruck, Austria*

14/12/2012 Doctoral School Seminar, *TU Graz, Austria*

15/06/2012 Advanced Topics in Discrete Mathematics, *TU Graz, Austria*

About free products of groups with one additional defining relation

This talk has been given at the following occasion:

26/01/2012 Structure Theory Seminar, *TU Graz, Austria*

The Tits alternative for non-spherical triangles of groups

Different versions of this talk have been given at the following occasions:

24/11/2015 Geometry and Analysis on Groups, Research Seminar, *University of Vienna, Austria*

17/10/2013 Mathematics Seminar, *University of Essex, Colchester, UK*

17/09/2013 27th Leoben–Ljubljana Seminar, *Graz, Austria*

08/03/2013 Mathematics Colloquium, *Syracuse University, NY, USA*

12/02/2013 Topology and Geometric Group Theory Seminar, *Cornell University, Ithaca, NY, USA*

03/08/2012 GAGTA 6, *Heinrich-Heine-University, Düsseldorf, Germany*

01/06/2012 Discrete Mathematics Day 2012, *TU Graz, Austria*

27/10/2011 Structure Theory Seminar, *TU Graz, Austria*

30/08/2011 Algebra and Geometry Seminar, *Goethe University, Frankfurt am Main, Germany*

CONFERENCES AND WORKSHOPS

25/08/2025 – 29/08/2025	EARLI 2025, <i>University of Graz, Austria</i>
03/03/2025 – 07/03/2025	58th GDM Congress, <i>Saarland University, Saarbrücken, Germany</i>
04/03/2024 – 08/03/2024	57th GDM Congress, <i>University of Duisburg-Essen, Germany</i>
29/08/2022 – 02/09/2022	56th GDM Congress, <i>Goethe University, Frankfurt am Main, Deutschland</i>
28/09/2020 – 01/10/2020	54th GDM Congress, Online Meeting, <i>University of Würzburg, Germany</i>
15/11/2019 – 16/11/2019	Workshop on Tertiary Mathematics Education, <i>PH Ludwigsburg, Germany</i>
04/03/2019 – 08/03/2019	53rd GDM Congress, <i>University of Regensburg, Germany</i>
11/02/2019 – 12/02/2019	Groups, Automata, and Graphs, <i>TU Graz, Austria</i>
17/01/2019 – 18/01/2019	Workshop on Fibonacci und Frederick II, <i>PH Ludwigsburg, Germany</i>
09/11/2018 – 10/11/2018	Workshop on Computer Science at School, <i>PH Ludwigsburg, Germany</i>
30/11/2017 – 01/12/2017	Christmas Tree Meeting of the GNC Network, <i>Orsay, France</i>
05/06/2017 – 09/06/2017	Geometric and Probabilistic Properties of Infinite Groups, <i>Lille, France</i>
07/12/2015 – 11/12/2015	Random Walks and Harmonic Functions on Groups, <i>CIB, Lausanne, Switzerland</i>
02/06/2014 – 06/06/2014	Groups, Graphs, and Random Walks, <i>Palazzone di Cortona, Italy</i>
24/02/2014 – 28/02/2014	Groups Acting on Rooted Trees and around (Geowalks), <i>IHP, Paris, France</i>
27/01/2014 – 31/01/2014	Random Walks on Groups (Geowalks), <i>IHP, Paris, France</i>
06/01/2014 – 17/01/2014	Introductory School to the Geowalks Trimester, <i>CIRM, Luminy, France</i>
22/09/2013 – 28/09/2013	18th ÖMG–DMV Congress, <i>University of Innsbruck, Austria</i>
16/09/2013 – 17/09/2013	27th Leoben–Ljubljana Seminar, <i>Graz, Austria</i>
28/05/2013 – 31/05/2013	GAGTA 7, <i>City College of New York, NY, USA</i>
20/09/2012 – 22/09/2012	26th Leoben–Ljubljana Seminar, <i>Bovec, Slovenia</i>
25/07/2012 – 03/08/2012	GAGTA 6, <i>Heinrich-Heine-University, Düsseldorf, Germany</i>
12/03/2012 – 16/03/2012	Groups 2012, <i>Bielefeld University, Germany</i>
06/03/2012 – 09/03/2012	10th German Probability and Statistics Days, <i>University of Mainz, Germany</i>
23/09/2011 – 24/09/2011	25th Leoben–Ljubljana Seminar, <i>University of Leoben, Austria</i>
03/07/2011 – 16/07/2011	GAGTA 5, <i>Polytechnic University of Catalonia, Manresa, Spain</i>
04/04/2011 – 15/04/2011	Discrete Probability, Ergodic Theory, and Combinatorics, <i>TU Graz, Austria</i>
25/08/2008 – 27/08/2008	Groups and Infinite Graphs, <i>Erwin Schrödinger Institute, Vienna, Austria</i>
12/12/2007 – 15/12/2007	Geometric Group Theory, <i>Georg-August-University, Göttingen, Germany</i>
27/08/2007 – 31/07/2007	GAGTA 2, <i>University of Dortmund, Germany</i>

AWARDS

Winner of the Doctoral School Award

2014

Doctoral School of Mathematics and Scientific Computing, Graz, Austria

Each academic year, the Doctoral School of Mathematics and Scientific Computing, which is jointly run by TU Graz and the University of Graz, awards this prize for the two best papers.

Winner of the Olivetti Egg

2013

Cornell University, Ithaca, NY, USA

This wooden egg is the prize for the best talk given at the Olivetti Club, a seminar at Cornell University in which graduate students are invited to present their favourite pieces of mathematics.

Nominee for “Hessische Hochschulpreis”

2008 & 2009

Goethe University, Frankfurt am Main, Germany

Holding recitation classes and grading homework is time consuming, but worth every minute. I derived huge benefit from my classes and it seems that some of my students did so, too. They nominated me twice for “Hessische Hochschulpreis für Exzellenz in der Lehre”.

Qualifier for “Bundeswettbewerb Jugend forscht”

2000

Stiftung Jugend forscht, Hamburg, Germany

About one year before graduating from secondary school, a classmate and I carried out a physics project and qualified for “Bundeswettbewerb Jugend forscht”, the final round of a big youth science competition in Germany.

FURTHER ACTIVITIES AT UNIVERSITY

PH Ludwigsburg, Germany

01/04/2024 – now	Member of the Study Committee (“Studien- und Prüfungsausschuss Sek I”)
01/10/2023 – now	Study Advisor in Mathematics for Prospective Special Education Teachers
01/10/2021 – now	Study Advisor in Mathematics for Prospective Secondary School Teachers
01/10/2021 – now	IT Representative of the Institute of Mathematics II

TU Graz & University of Graz, Austria

15/10/2015 – 14/05/2016	Coordinator of the Doctoral Programme DK W1230 “Discrete Mathematics”
08/04/2013 – 13/03/2014	Student Member of the Coordinating Team of the joint Doctoral School of Mathematics and Scientific Computing

Goethe University, Frankfurt am Main, Germany

01/10/2007 – 30/09/2010	Student Member of the Department Council (“Direktorium des IfM”)
01/04/2007 – 31/03/2008	Student Member of the Faculty Council (“Fachbereichsrat des FB12”)
01/04/2006 – 31/03/2007	Deputy Student Member of the Faculty Council (“Fachbereichsrat des FB12”)

FURTHER INTERESTS

► Field Hockey

► Computer Programming

► Languages and Grammar

My mother tongue is German and I am fluent in English. Since I have always been interested in languages and, particularly, in their grammar, I took classes in French, Italian, Swedish, Latin, Greek, and Sanskrit.

MY FAVOURITE POEM



*Schläft ein Lied in allen Dingen,
die da träumen fort und fort,
und die Welt hebt an zu singen,
triffst Du nur das Zauberwort.*

Joseph von Eichendorff

*Sleeps a song in things abounding
that keep dreaming to be heard:
Earth's tunes will start resounding
if you find the magic word.*

Translation by Walter A. Aue

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Contact: waue@dal.ca

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