Dr. Peter Mayr

Department of Mathematics, CU Boulder
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Degrees

2013 Habilitation	Mathematics (venia docendi), JKU Johannes Kepler University Linz, Austria
2004 Ph.D.	Mathematics (Doktor der technischen Wissenschaften), JKU Linz, Austria
1999 M.Sc.	Mathematics (Dipl.-Ingenieur), JKU Linz, Austria

Employment at academic institutions

2020 – present	Associate professor, CU Boulder, Colorado
2015 – 2020	Assistant professor, CU Boulder, Colorado
2012 – 2015	Research associate, JKU Linz, Austria
2009 – 2012	Research associate, Centro de Álgebra da Universidade de Lisboa, Lisbon, Portugal
2007 – 2009	Assistant professor, JKU Linz, Austria
2006 – 2007	Erwin Schrödinger fellow, CU Boulder, Colorado
2004 – 2006	Assistant professor, JKU Linz, Austria
2003 – 2004	Research assistant, JKU Linz, Austria
2002 – 2003	Visiting researcher, UW Madison, Wisconsin

Current research interests

- Universal algebra and logic: clones of operations and relations, equational theories, classification and structure of finite algebras, duality

- Computer algebra: algorithms, structure and complexity issues for computational problems on general algebras, constraint satisfaction problems

- Classical algebra: group actions, permutation groups, semigroups

Grants and awards

1. NSF grant no. DMS-2452289: Structure and computation in nilpotent algebras (2025–2028), $80.000, PI.

2. NSF grant no. DMS-2519783, conference proposal: BLAST 2025, 2026, 2027, $93.000, PI.

3. NSF grant no. DMS-2223126, conference proposal: BLAST 2022, 2023, 2024, $84.000, PI.

4. NSF grant no. DMS-1728937, conference proposal: BLAST 2017, 2018, 2019, $84.000, co-PI.

5. NSF collaborative research grant no. DMS-1500254: Algebra and algorithms, structure and complexity theory (2015–2019), $144.000, co-PI.

6. FWF (Austrian Science Fund) project: Computations in direct products (2012 – 2015), 350.000 Euro, PI.

7. Erwin Schrödinger Grant of the FWF (Austrian Science Fund): Clones on groups (2006 – 2007), 34.000 Euro, PI.

8. FWF (Austrian Science Fund) project: Planar near-rings – theory and applications (2002–2005), co-PI.

9. Award of the Austrian Math. Society (Studienpreis der ÖMG): Best Austrian Master's thesis in Mathematics in 1999.

Refereed publications

Papers are in reverse chronological order, authors in alphabetical order as is the convention in Mathematics.

1. M. Kompatscher and P. Mayr. *Every finite nilpotent loop has a supernilpotent loop as reduct.* Results Math. 81, no. 1, Paper No. 21, 2026.

2. P. Mayr and P. Wynne. *Clonoids between modules.* International Journal of Algebra and Computation (IJAC), 34(4):543–570, 2024.

3. P. Mayr. *Vaughan–Lee's nilpotent loop of size 12 is finitely based.* Algebra Universalis, 85(1):Paper No. 2, 2024.

4. P. Mayr. *On the complexity dichotomy for the satisfiability of systems of term equations over finite algebras.* 48th International Symposium on Mathematical Foundations of Computer Science (MFCS 2023), Leibniz International Proceedings in Informatics (LIPIcs) 272, 66:1–66:12, 2023.

5. A. Kazda, P. Mayr and D. Zhuk. *Small Promise CSPs reducing to large CSPs.* Log. Methods Comput. Sci. 18, no. 3, Paper No. 25, 14 pp, 2022.

6. P. Mayr and Á. Szendrei. *Algebras from congruences.* Algebra Universalis, 82(55), 2021.

7. G. Deng, E. El Sai, T. Manders, P. Mayr, P. Nakkirt, A. Sparks. *Sandwiches for Promise Constraint Satisfaction.* Algebra Universalis, 82(15), 2021.

8. W. DeMeo, P. Mayr and N. Ruškuc. *Bounded homomorphisms and finitely generated fiber products of lattices.* International Journal of Algebra and Computation (IJAC), 30(4), 693–710, 2020.

9. P. Mayr and N. Ruškuc. *Presentations for subrings and subalgebras of finite co-rank.* Quarterly Journal of Mathematics, 71(1), 53–71, 2020.

10. P. Mayr and N. Ruškuc. *Generating subdirect products.* Journal London Math. Soc., 100(2), 404–424, 2019.

11. A. Bulatov, P. Mayr and Á. Szendrei. *The subpower membership problem for finite algebras with cube terms.* Log. Methods Comput. Sci. 15, no. 1, Paper No. 11, 48 pp, 2019.

12. K. Kearnes, P. Mayr, and N. Ruškuc. *Solvable quotients of subdirect products of perfect groups are nilpotent.* Bulletin London Math. Soc., 50(6), 1016–1026, 2018.

13. P. Mayr and N. Ruškuc. *Finiteness properties of direct products of algebraic structures.* J. Algebra, 494, 167—187, 2018.

14. A. Bulatov, M. Kozik, P. Mayr, and M. Steindl. *The subpower membership problem for semigroups.* International Journal of Algebra and Computation (IJAC), 26(7), 1435–1451, 2016.

15. H. Chen and P. Mayr. *Quantified Constraint Satisfaction on monoids.* 25th EACSL Annual Conference on Computer Science Logic (CSL 2016). Jean-Marc Talbot and Laurent Regnier (Eds.), LIPICS Vol. 62.

16. E. Aichinger and P. Mayr. *Finitely generated equational classes.* Journal Pure and Applied Algebra, 220, 2816–2827, 2016.

17. E. Aichinger and P. Mayr. *Independence of algebras with edge term.* International Journal of Algebra and Computation (IJAC), 25(7), 1145–1157, 2015.

18. E. Aichinger, P. Mayr and R. McKenzie. *On the number of finite algebraic structures.* Journal European Math. Society (JEMS), 16(8), 1673–1686, 2014.

19. W. Bentz and P. Mayr. *Supernilpotence prevents dualizability.* Journal Australian Math. Society, 96, 1–24, 2014.

20. P. Mayr. *On finitely related semigroups.* Semigroup Forum, 86(3), 613–633, 2013.

21. P. Mayr. *The subpower membership problem for Mal'cev algebras.* International Journal of Algebra and Computation (IJAC), 22(7), 1250075 (23 pages), 2012.

22. G. Horváth, P. Mayr, and A. Pongrácz. *Characterizing translations on groups by cosets of their subgroups.* Comm. Algebra, 40, 3141–3168, 2012.

23. E. Aichinger, P. Mayr, J. D. P. Meldrum, G. L. Peterson and S. D. Scott. *Units of compatible nearrings.* Monatsh. Math., 164(2), 119–132, 2011.

24. P. Mayr. *Mal'cev algebras with supernilpotent centralizers.* Algebra Universalis, 65(2), 193–211, 2011.

25. K. Kaarli and P. Mayr. *Polynomial functions on subdirect products.* Monatsh. Math., 159(4), 341–359, 2010.

26. E. Jabara and P. Mayr. *Frobenius complements of exponent dividing $2^m * 9$.* Forum Math., 21(2), 217–220, 2009.

27. P. Mayr. *Polynomial functions on squarefree groups.* International Journal of Algebra and Computation (IJAC), 18(4), 759–777, 2008.

28. G. Landsmann, P. Mayr and J. Schicho. *A topological property of polynomial functions on $GL(2, \mathbb{R})$.* Aequationes Math., 73(1-2), 71–77, 2007.

29. E. Aichinger and P. Mayr. *Polynomial clones on groups of order pq.* Acta Math. Hungar., 114(3), 267–285, 2007.

30. P. Mayr. *The polynomial functions on Frobenius complements.* Acta Sci. Math. (Szeged), 72(1-2), 37–50, 2006.

31. P. Mayr. *Sharply 2-transitive groups with point stabilizer of exponent 3 or 6.* Proc. Amer. Math. Soc., 134(1), 9–13, 2006.

32. T. Boykett and P. Mayr. *Fixed-point-free automorphism groups from rings.* Southeast Asian Bull. Math., 29(2), 253–257, 2005.

33. T. Boykett and P. Mayr. *Difference methods and Ferrero pairs.* In Kiechle, Hubert (ed.) et al., Nearrings and nearfields. Proceedings of the conference on nearrings and nearfields, Hamburg, Germany, July 27-August 3, 2003. Dordrecht: Springer, 177–187, 2005.

34. E. Aichinger and P Mayr. *Polynomial functions and endomorphism near-rings on certain linear groups.* Comm. Algebra, 31(11), 5627–5651, 2003.

35. P. Mayr and F. Morini. *Nearrings whose set of N-subgroups is linearly ordered.* Results Math., 42(3-4), 339–348, 2002.

36. F. Binder and P. Mayr. *Algorithms for finite near-rings and their N-groups.* J. Symbolic Comput., 32(1-2), 23–38, 2001.

37. E. Aichinger, F. Binder, J. Ecker, P. Mayr and C. Nöbauer. *Algorithms for near-rings of non-linear transformations.* Proceedings of the ISSAC 2000, 23–29, St. Andrews, Scotland, ACM, 2000.

Software

38. E. Aichinger, F. Binder, J. Ecker, P. Mayr and C. Nöbauer. *SONATA (GAP package for computation with nearrings), version 2.9.1 (2018).* https://gap-packages.github.io/sonata/

Submitted for publication

39. P. Mayr and N. Ruškuc. *Automorphism groups of Boolean powers with ample generics.* (27 pages), submitted 2025. https://arxiv.org/abs/2509.20121

40. P. Mayr. *Solvable, nilpotent and supernilpotent semigroups with completely simple ideal and monoids.* (23 pages), submitted 2025. https://arxiv.org/abs/2505.09303

41. P. Mayr and N. Ruškuc. *Filtered Boolean powers of finite simple non-abelian Mal'cev algebras.* (34 pages), submitted 2024. https://arxiv.org/abs/2404.17322

Manuscripts

42. P. Mayr and N. Ruškuc. *Finite direct powers of simple Mal'cev algebras are Ramsey.* Unpublished manuscript.

Talks

Invited plenary talks at conferences are highlighted.

1. *Boolean powers of finite simple Mal'cev algebras.* Homogeneous Structures: Model Theory meets Universal Algebra, Mathematisches Forschungsinstitut Oberwolfach, December 2025.

2. *Boolean powers of finite simple Mal'cev algebras.* TU Wien, Austria, October 2025.

3. *(Super)nilpotent semigroups with completely simple ideal.* 2025 AMS Sectional Meeting, Denver, Colorado, August 2025.

4. *Supernilpotent reducts of loops.* 2025 AMS Sectional Meeting, Denver, Colorado, August 2025.

5. **Die Mathematik hinter Zauberwürfel und Sudoku. AAA 107 – Workshop on General Algebra, Open Session, Bern, Switzerland, June 2025.**

6. *Solvable and (super)nilpotent semigroups with completely simple ideal.* AAA 107 – Workshop on General Algebra, Bern, Switzerland, June 2025.

7. *Super reducts.* Linz Algebra Research Day – LARD 2025, Linz, Austria, June 2025.

8. *Automorphism groups of filtered Boolean powers.* AAA 105 – Workshop on General Algebra, Prague, Czechia, June 2024.

9. *2-nilpotent algebras.* Linz Algebra Research Day – LARD 2024, Linz, Austria, June 2024.

10. *Filtered Boolean powers of simple algebras.* 2024 North American Annual Meeting of the ASL, Ames, Iowa, May 2024.

11. *Solvable semigroups.* BLAST 2024, University of North Texas, April 2024.

12. *On the complexity dichotomy for the satisfiability of systems of term equations over finite algebras.* MFCS 2023 – Mathematical Foundations in Computer Science, Bordeaux, France, August 2023.

13. *Commutator theory for semigroups.* TCA 2023 – Conference on theoretical and computational algebra, Pocinho, Portugal, July 2023.

14. *Checking for abelian cores.* Linz Algebra Research Day – LARD 2023, Linz, Austria, June 2023.

15. *The powers of simple algebras.* AAA 103 – Workshop on General Algebra, Tartu, Estonia, June 2023.

16. *Systems of term equations over finite algebras.* BLAST 2023, University of North Carolina, Charlotte, North Carolina, May 2023.

17. *Systems of term equations.* Linz Algebra Research Day – LARD 2022, Linz, Austria, December 2022.

18. *The finite basis problem im general algebra.* Pure Maths Colloquium, University of St Andrews, UK, September 2022.

19. *Vaughan-Lee's loop of size 12 is finitely based.* BLAST 2022, Chapman University, Orange, California, August 2022.

20. *Supernilpotent reducts of nilpotent algebras.* AAA 102 – Workshop on General Algebra, Szeged, Hungary, June 2022.

21. *Supernilpotence.* Linz Algebra Research Day – LARD 2022, Linz, Austria, June 2022.

22. *Algebras from homomorphism kernels.* National Meeting of the Portuguese Mathematical Society – ENSPM 2021, online, July 2021.

23. *Fraïssé limit of powers of simple algebras.* Linz Algebra Research Day – LARD 2021, Linz, Austria (online), June 2021.

24. *Small PCSPs that reduce to large CSPs.* AAA 101 – Workshop on General Algebra, Novi Sad, Serbia (online), June 2021.

25. **Algebras from congruences. AAA 100 – Workshop on General Algebra, Krakow, Poland (online), February 2021.**

26. **On varieties generated by finite simple groups. Homogeneous Structures: Model Theory meets Universal Algebra, Oberwolfach, Germany (online), January 2021.**

27. *Promises and sandwiches.* Linz Algebra Research Day – LARD 2020, Linz, Austria, June 2020.

28. *What are nilpotent semigroups?* Linz Algebra Research Day – LARD 2019, Linz, Austria, December 2019.

29. **Commutators for semigroups. ICSAA 2019 – International Conference on Semigroups and Applications, Cochin, India, December 2019.**

30. *Generating subdirect products of lattices.* AAA 98 – Workshop on General Algebra, Dresden, Germany, June 2019.

31. *Commutators of subdirect products.* AAA 97 – Workshop on General Algebra, Vienna, Austria, February 2019.

32. *Complexity for transformation semigroups.* International Conference on Semigroups 2018, Lisbon, Portugal, July 2018.

33. *Subdirect products of perfect groups.* Linz Algebra Research Day – LARD 2018, Linz, Austria, June 2018.

34. *Computing with transformation semigroups.* Technical University Vienna Algebra Seminar, Vienna, Austria, June 2018.

35. *Universal algebra for groups.* Workshop Algebra and Algorithms, Honolulu, Hawaii, May 2018.

36. *Presentations for subrings of finite co-rank.* AAA 95 – Workshop on General Algebra, Bratislava, Slovakia, February 2018.

37. *Reidemeister-Schreier for rings.* Rocky Mountain Algebraic Combinatorics Seminar, CSU Fort Collins, Colorado, September 2017.

38. **Computing in direct products of algebras. BLAST 2017, Nashville, Tennessee, August 2017.**

39. *The complexity of quantified constraint satisfaction on monoids.* Workshop: Symmetry in finite and infinite structures, Lisbon, Portugal, July 2017.

40. **A few algebras, subpowers and relations. Symmetry in finite models (Conference to celebrate the 70th anniversary of Peter J. Cameron), Lisbon, Portugal, July 2017.**

41. *The complexity of quantified constraint satisfaction on monoids.* AAA 94 – Workshop on General Algebra, Novi Sad, Serbia, June 2017.

42. *Reidemeister-Schreier for rings.* Linz Algebra Research Day – LARD 2017, Linz, Austria, June 2017.

43. *Quantified constraint satisfaction in monoids.* 2017 AMS Sectional Meeting, Charleston, South Carolina, March 2017.

44. **Zauberwürfel, Sudoku und Algebra. AAA 93 – Workshop on General Algebra, Open Session, Bern, Switzerland, February 2017**.

45. *Subpower membership in residually small varieties with cube term* AAA 93 – Workshop on General Algebra, Bern, Switzerland, February 2017.

46. *Finite generation and presentation for subdirect products of loops.* 2016 AMS Sectional Meeting, Denver, Colorado, October 2016.

47. *Finitely generated congruence modular varieties.* Front Range Logic Saturdays, Golden, Colorado, September 2016.

48. *Finiteness conditions for subdirect products.* AAA 92 – Workshop on General Algebra, Prague, Czech Republic, May 2016.

49. *Computational problems for direct products of algebras.* 2015 International Meeting of AMS/EMS/SPM, Porto, Portugal, June 2015.

50. ***Computations in direct powers.* AAA 90 – Workshop on General Algebra, Novi Sad, Serbia, June 2015.**

51. *Deciding supernilpotence.* BLAST 2015, Las Cruces, New Mexico, January 2015.

52. *Direct products and finite presentations.* Linz Algebra Research Day – LARD 2014, Linz, Austria, October 2014.

53. ***Finitely generated varieties with edge term.* Algebras and Clones fest, Prague, Czech Republic, June 2014.**

54. *Finite generation and direct products.* AAA 88 – Workshop on General Algebra, Warsaw, Poland, June 2014.

55. *Computing in direct powers.* Workshop "Algebra and its applications", Mokko, Estonia, April 2014.

56. *Generating direct powers.* Linz Algebra Research Day – LARD 2013 (Christmas edition), Linz, Austria, December 2013.

57. *Finitely related algebras.* Habilitation Colloquium, JKU Linz, Austria, October 2013.

58. *Finiteness properties of direct products.* 2013 AMS Southeastern Sectional Meeting, Louisville, Kentucky, October 2013.

59. *The degree of operations on groups.* Kangro-100 Methods of Analysis and Algebra, Tartu, Estonia, September 2013.

60. *Supernilpotence prevents dualizability.* BLAST 2013, Orange, California, August 2013.

61. *Functions on p-groups are like homomorphisms.* Linz Algebra Research Day – LARD 2013, Linz, Austria, June 2013.

62. *Supernilpotence prevents dualizability.* NSAC 2013, Novi Sad, Serbia, June 2013.

63. *The degree of operations on groups.* CU Boulder, Colorado, April 2013.

64. *Termoperationen und Relationen auf algebraischen Strukturen.* Johannes Kepler Symposium, JKU Linz, Austria, March 2013.

65. *Operations on p-groups are basically homomorphisms.* AAA 85 – Workshop on General Algebra, Luxemburg, February 2013.

66. *Kurze Darstellungen von Unteralgebren direkter Produkte und ihre Anwendungen.* TU Dresden, Germany, January 2013.

67. *Computation in direct powers.* Pure Math Colloquium, University of St Andrews, UK, December 2012.

68. *Finitely related semigroups.* Workshop on Semigroups, Lisbon, Portugal, May 2012.

69. ***Almost all semigroups are finitely related.* AAA 83 – Workshop on General Algebra, Novi Sad, Serbia, March 2012.**

70. *Checking membership in direct powers.* Groups and Semigroups: Interactions and Computations, Lisbon, Portugal, July 2011.

71. *On the subpower membership problem for Malc'ev algebras.* 2011 AMS Spring Central Sectional Meeting, Iowa City, Iowa, March 2011.

72. *Recognizing partial term functions.* AAA 81 – Workshop on General Algebra, Salzburg, Austria, February 2011.

73. *On the number of finite algebras.* Seminario de Algebra, University of Coimbra, Portugal, December 2010.

74. *Term functions and subalgebras.* Workshop on Algebra, Lisbon, Portugal, July 2010.

75. ***Algebras with few subpowers are finitely related.* International Conference on Algebras and Lattices, Prague, Czech Republic, June 2010.**

76. *Subpower membership and interpolation.* Workshop on Algebra, Complexity and CSP, Lisbon, Portugal, June 2010.

77. *On finitely related clones.* 2010 AMS Spring Central Sectional Meeting, St Paul, Minnesota, April 2010.

78. *Some finitely related clones.* AAA 79 – Workshop on General Algebra, Olomouc, Czech Republic, February 2010.

79. *Nearrings of polynomial functions on expanded groups.* 21st International Conference on Near-rings and Near-fields, Vorau, Austria, July 2009.

80. *Describing polynomial functions implicitly.* Linz Algebra Research Day – LARD 2009, Linz, Austria, June 2009.

81. *Polynomial functions and higher commutators.* AAA 78 – Workshop on General Algebra, Bern, Switzerland, June 2009.

82. *Are Mal'cev clones finitely related?* Charles University Prague, Czech Republic, May 2009.

83. *Affine complete G-sets.* 2009 AMS Spring Central Sectional Meeting, Urbana, Illinois, March 2009.

84. *Functions that are compatible with group actions.* Southern Regional Algebra Conference 2009, Mobile, Alabama, March 2009.

85. *Are polynomial clones of Mal'cev algebras finitely related?* Eötvös Lorand University Budapest, Hungary, December 2008.

86. *Affine complete G-sets.* Eötvös Lorand University Budapest, Hungary, December 2008.

87. *Polynomial functions on subdirect products.* AAA 76 – Workshop on General Algebra, Linz, Austria, May 2008.

88. *Frobenius complements of exponent $2^m \cdot 9$ are finite.* 2008 Joint Mathematics Meetings, San Diego, California, January 2008.

89. *Polynomial clones on squarefree groups and certain Mal'cev algebras.* AAA75 – Workshop on General Algebra, Darmstadt, Germany, November 2007.

90. *Polynomial clones on squarefree groups.* International Conference on Order, Algebra, and Logic, Nashville, Tennessee, July 2007.

91. *Functions on algebras.* Buffalo State College, New York, March 2007.

92. *Sharply 2-transitive permutation groups.* University of Tartu, Estonia, May 2006.

93. *Clones on expanded groups.* University of Tartu, Estonia, May 2006.

94. *On polynomial functions on squarefree expanded groups.* AAA 71 – Workshop on General Algebra, Bedlewo, Poland, February 2006.

95. *Construction and analysis of near-rings.* Sage Days 2006, San Diego, California, February 2006.

96. *Sharply 2-transitive permutation groups with point stabilizer of finite exponent.* Groups St Andrews 2005, UK, August 2005.

97. *Varieties of nearrings satisfying $x^n = x$.* NSAC 05, Novi Sad, Serbia, July 2005.

98. *Clones containing the polynomial functions on groups of order pq.* Conference on Universal Algebra and Lattice Theory, Szeged, Hungary, July 2005.

99. *A topological property of polynomials on some general linear groups.* AAA 70 – Workshop on General Algebra, Vienna, Austria, May 2005.

100. *Polynomial functions on classical groups and Frobenius groups.* AAA 68 – Workshop on General Algebra, Dresden, Germany, June 2004.

101. *Endomorphism near-rings on classical groups.* University of Tainan, Taiwan, September 2003.

102. *Polynomial functions on groups.* University of Taipei, Taiwan, September 2003.

103. *Polynomial functions on linear groups.* 18th International Conference on Nearrings and Nearfields, Hamburg, Germany, July 2003.

104. *Sharply 2-transitive groups.* UW Madison, Wisconsin, April 2003.

105. *Polynomial functions on linear groups.* UW Madison, Wisconsin, October 2002.

106. *On Frobenius groups.* 17th International Conference on Nearrings and Near-fields, Harrisonburg, Virginia, July 2001.

107. *SONATA Workshop 2001.* 17th International Conference on Nearrings and Nearfields, Harrisonburg, Virginia, July 2001.

108. *Fixed-point-free representations of finite groups.* AAA 62 – Workshop on General Algebra, Linz, Austria, June 2001.

109. *On weakly divisible near-rings.* Universita Degli Studi Brescia, Italy, February 2001.

110. *On finite fixed-point-free automorphism groups.* 16th International Conference on Nearrings and Nearfields, Edinburgh, UK, July 1999.

111. *Fixed-point-free automorphisms.* AAA 58 – Workshop on General Algebra, Vienna, Austria, June 1999.

112. *Ferrero pairs and their construction in SONATA.* Universita Cattolica del Sacro Cuore Brescia, Italy, May 1999.

113. *On some properties of linear codes from finite planar near-rings.* 15th International Conference on Nearrings and Nearfields, Stellenbosch, South Africa, July 1997.

Teaching

Independent studies at CU Boulder

Intermediate Complexity with C. Crotwell, Spring 2024
Finite Basis Problems with N. Jamesson, C. Meadors, C. Meredith, M. Muro, P. Wynne, Spring 2022
General Algebra with J. DuBeau, J. Ornstein, A. Sparks, M. Wheeler, P. Wynne, Spring 2020
Semigroup Theory with J. DuBeau, T. Jack, M. Pullins, M. Wheeler, Spring 2018
Computability Theory with T. Jack, A. Sparks, Fall 2016

REU at CU Boulder

Promises and Constraints (research experience for undergraduates co-organized with A. Sparks) with G. Geng, E. El Sai, T. Manders, P. Nakkirt, May-June 2019

CU Boulder

Math 2001 – Introduction to Discrete Mathematics	Fall 2015, Fall 2016, Spring 2018, Spring 2020, Fall 2020, Fall 2025
Math 2130 – Linear Algebra for Non-Math Majors	Fall 2021
Math 2135 – Linear Algebra for Math Majors	Fall 2018, Spring 2019, Fall 2019, Fall 2024, Fall 2025
Math 3130 – Introduction to Linear Algebra	Spring 2016
Math 3140 – Abstract Algebra 1	Fall 2016, Fall 2021, Spring 2024
Math 4000/5000 – Foundations of Mathematics	Fall 2024
Math 4140 – Abstract Algebra 2	Spring 2024
Math 6010 – Computability Theory	Fall 2015, Spring 2019, Spring 2021, Fall 2023
Math 6140 – Modern Algebra 2	Spring 2017, Spring 2018, Spring 2022, Spring 2025
Math 6270 – Theory of Groups	Fall 2019

JKU Linz, Austria

Algebra for Computer Science Majors	Fall 2007, Fall 2008
Algebra for Computer Science Majors (TA)	Fall 2000, Fall 2001
Algebra Seminar	Spring 2005, Fall 2005, Spring 2006, Fall 2007, Fall 2008
Algorithmic Abstract Algebra	Fall 2013
Discrete Mathematics	Spring 2008
Introduction to Algebra (TA)	Spring 1999, Spring 2009, Spring 2014
Linear Algebra (TA)	Spring 1999, Fall 1999, Spring 2000, Fall 2000, Spring 2001, Fall 2001, Fall 2004, Spring 2005, Fall 2012, Spring 2013, Fall 2014
Representation Theory of Finite Groups	Spring 2002, Spring 2004, Spring 2006

University of Lisbon, Portugal

Coding Theory (TA)	Spring 2011

University of Applied Sciences Upper Austria, Austria

Calculus (TA)	Spring 2005
Coding Theory and Cryptography (TA)	Fall 2004, Fall 2005, Fall 2007
Discrete Mathematics (TA)	Fall 2005, Fall 2007, Fall 2008
Linear Algebra (TA)	Fall 1999, Spring 2000, Fall 2000, Spring 2001, Fall 2001, Spring 2002, Fall 2005, Fall 2007
Probability Theory and Statistics (TA)	Fall 2000, Fall 2001

Mentoring and advising

Postdoctoral fellows

W. DeMeo, 2017-2019, CU Boulder.
M. Steindl, January-December 2016, CU Boulder.

Ph.D. students

N. Jamesson, (comprehensive exam, 2023) CU Boulder.
S. Lee, (comprehensive exam, 2020) CU Boulder.
M. Muro. Characterizing finitely based abelian Mal'cev varieties and supernilpotence in varieties with weak difference term. Ph.D., CU Boulder 2025.
P. Wynne. Clonoids and nilpotent Mal'cev algebras. Ph.D., CU Boulder 2024.
C. Bridges. Occurrences of the embedding problem with Galois groups of prime power order. Ph.D., CU Boulder 2023, co-advised with Á. Szendrei.
T. Jack. Computational complexity of semigroup properties. Ph.D., CU Boulder, 2020.
A. Sparks. Clonoids and Promise Constraint Satisfaction Problems. Ph.D., CU Boulder, 2020.
M. Steindl. Computations in direct products. Ph.D., JKU Linz, Austria, 2015.
O. Koshik. Categorical equivalence of algebras. Ph.D., University of Tartu, Estonia, 2015, co-advised with K. Kaarli.

Master's students

C. Crotwell. P vs NP and intermediate complexity. MSc, CU Boulder, 2024.
S. Zweckinger. Computing in direct powers of expanded groups. MSc, JKU Linz, Austria, 2013.
F. Renetseder-Saxinger. Computer-assisted analysis of polynomial completeness for groups and rings. MSc, JKU Linz, Austria, 2013, co-advised jointly with E. Aichinger.
B. Mayrhauser. A survey of results on Černý's conjecture on finite automata. MSc, JKU Linz, Austria, 2009, co-advised jointly with E. Aichinger.

Undergraduate students

S. Kreinecker. Equations for semigroups. Bachelor's thesis, JKU Linz, Austria, 2014.

Member of habilitation committee

E. Lehtonen. Reconstruction of functions from minors. Habilitation, TU Dresden, Germany, 2018.

Second reader of Ph.D. thesis and member of dissertation committee

J. Kolegar. Finite ordered semigroups: combinatorial properties and irreducible classes. Ph.D., Masaryk University, Brno, Czech Republic, 2025.
D. Glasson. Finitely related semigroups and associated structures. Ph.D., RMIT , Australia, 2024.
B. Rossi. Universal algebraic geometry and polynomial interpolation. Ph.D., JKU Linz, Austria, 2024.
C. Meredith. Nilpotence and dualizability of algebras of finite type. Ph.D., CU Boulder, 2024.
J. Rabie. Contributions to the theory of near-vector spaces, their geometry, and hyperstructures. Ph.D., University of Stellenbosch, South Africa, 2022.
J. DuBeau. Jónsson Jónsson-Tarski algebras. Ph.D., CU Boulder, 2022.
J. P. Rooney. Mal'sev condition satisfaction problems. Ph.D., McMaster University, Canada, 2020.
M. Pullins. Generically 2-transitive algebraic group actions with solvable point stabilizer. Ph.D., CU Boulder, 2020.
K. Berg. The complexity of homomorphism factorization. Ph.D., CU Boulder, 2019.

J. Shriner. Hardness results for the subpower membership problem. Ph.D., CU Boulder, 2018.

A. Moorhead. Higher commutator theory for congruence modular varieties. Ph.D., CU Boulder, 2017.

J. Linman. Minimal functions on the random permutation. Ph.D., CU Boulder, 2016.

J. Opršal. Relational approach to universal algebra. Ph.D., Charles University Prague, Czech Republic, 2016.

Member of dissertation committee

C. Meadors. Local finiteness in varieties of MS4-algebras. Ph.D., CU Boulder, 2025.

M. Wheeler. A nonstandard approach to Keisler's order. Ph.D., CU Boulder, 2023.

M. Levet. On the combinatorial and logical complexities of algebraic structures. Ph.D., CU Boulder, 2023.

L. Gagnon. Advances in the combinatorics of the unipotent upper triangular groups. Ph.D., CU Boulder, 2022.

T. Schrock. On the complexity of isomorphism in finite group theory and symbolic dynamics. Ph.D., CU Boulder, 2019.

S. Weinell. On the descending central series of higher commutators. Ph.D., CU Boulder, 2019.

C. Scherer. Maximal comparable and incomparable sets in Boolean algebras. Ph.D., CU Boulder, 2016.

Member of honors thesis committee

G. Schebel. Current-voltage relationship in chiral orbital current materials, Physics, CU Boulder, 2025.

N. Collins. Weisfeiler–Leman and group isomorphism. Mathemathics, CU Boulder, 2023.

A. Adler. Classical simulation of ultracold dipolar collisions. Physics, CU Boulder, 2022.

Member of Ph.D. qualifying exam committee at CU Boulder

R. Green, 2024			
J. Gensler, 2023	C. Meadors, 2021	S. Lee, 2020	A. Lotfi, 2017
N. Jamesson, 2023	J. Willson, 2021	P. Wynne, 2020	A. Sparks, 2017
M. Levet, 2022	H. Davenport 2021	J. Ornstein, 2019	T. Jack, 2016
B. Wilson, 2022	C. Eblen, 2021	M. Wheeler, 2018	M. Pullins, 2016
M. Muro, 2021	C. Meredith, 2020	J. DuBeau, 2018	S. Weinell, 2015

Editorial work, reviewing and refereeing

- Editor for Algebra Universalis

- Reviewer for MathSciNet, Zentralblatt Math, MIT Press

- Referee for conferences:
  CCC 2025 (Computational Complexity Conference)
  ICALP 2025 (The 52th International Colloquium on Automata, Languages and Programming)
  STACS 2024 (41st International Symposium on Theoretical Aspects of Computer Science)
  FOCS 2021 (62nd Annual IEEE Symposium on Foundations of Computer Science)
  ICALP 2020 (The 47th International Colloquium on Automata, Languages and Programming)
  MFCS 2020 (45th International Symposium on Mathematical Foundations of Computer Science)
  STOC 2020 (52nd Annual ACM Symposium on Theory of Computing)

- Referee for journals:

  Acta Math. Hung.
  Algebra Universalis
  American Math. Monthly
  Annals of Combinatorics
  Bulletin London Math. Soc.
  Canadian Math. Bulletin
  Communications in Algebra
  Discrete Math. Theor. Comput. Sci.
  Internat. J. Algebra Comput.
  J. Algebra
  J. Aust. Math. Soc.
  J. Comput. System Sci.
  J. Europ. Math. Soc.
  J. Math. Logic
  J. Mult. Valued Logic
  J. Pure Applied Algebra
  Leibniz Internat. Proc. in Informatics
  Math. Afrika
  Math. Pannonica
  Memoirs AMS
  Order
  Proceedings London Math. Soc.
  Quaest. Math.
  Quasigroups and Related Systems
  Rep. Math. Logic
  Results Math.
  Rocky Mountain J. Math.
  SIAM Journal on Computing
  Semigroup Forum
  Theoretical Computer Science
  Transactions on Computational Logic

- Reviewing grant applications and research portfolios for:
  Austrian Academy of Sciences (OeAW)
  Chilean National Science and Technology Commission (CONICYT - Chile)
  Deutsche Forschungsgemeinschaft (DFG - Germany)
  Natural Sciences and Engineering Research Council of Canada (NSERC)
  South African National Research Foundation (NRF)

Membership in professional organizations

American Mathematical Society, Austrian Mathematical Society, Association for Symbolic Logic

Conference organization

1. Joint Mathematics Meetings AMS Special Session on Algebras and Algorithms, Denver, Colorado, August 2025, co-organizer.

2. BLAST 2025 – Conference on Boolean Algebras, Algebraic Logic, Universal Algebra, Set Theory, Point-free Topology, Boulder, Colorado, May 2025, co-organizer.

3. Conference on Theoretical and Computational Algebra, Special Session on Structure and Computation in General Algebras, Pocinho, Portugal, July 2023, organizer.

4. Joint Mathematics Meetings AMS Special Session on Algebras and Algorithms, Denver, Colorado, January 2020, co-organizer.

5. BLAST 2019 – Conference on Boolean Algebras, Algebraic Logic, Universal Algebra, Set Theory, Point-free Topology, Boulder, Colorado, May 2019, co-organizer.

6. Algebra and Algorithms 2016 – Structure and Complexity Theory Workshop, Boulder, Colorado, May 2016, co-organizer.

7. LARD 2014 – Linz Algebra Research Day, Linz, Austria, October 2014, organizer.

8. AAA 87 – Workshop on General Algebra, Linz, Austria, February 2014, co-organizer.

9. LARD 2013 – Linz Algebra Research Day, Linz, Austria, June 2013, organizer.

10. Workshop on Universal Algebra, Complexity and CSP, Lisbon, Portugal, June 2010, co-organizer.

11. LARD 2009 – Linz Algebra Research Day, Linz, Austria, June 2009, organizer.

12. AAA 76 – Workshop on General Algebra, Linz, Austria, May 2008, co-organizer.

13. LARD 2008 – Linz Algebra Research Day, Linz, Austria, 2008, co-organizer.

Outreach

- CU Boulder Math Club: *The busy beaver at the end of Math*, talk, CU Boulder, Colorado, November 2019.

- CU Boulder Math Club: *Rubik's cube versus Sudoku*, talk, CU Boulder, Colorado, November 2016.

- Consulting on mathematical content for the production of the play "Incendies" by Wajdi Mouawad at Landestheater Linz, Austria, November 2014.

- Kepler Salon: *Puzzles and Math*, public lecture, Linz, Austria, October 2014.

- 5 day Workshop Applied Mathematics: Coding Theory for gifted high school students, Zell an der Pram, Austria, February 2005.

Service at the Math Department, CU Boulder

- Co-organizer of the Graduate Algebra and Logic Seminar, Fall 2015 – Fall 2020, Fall 2024 – present

- Co-organizer of the online Panglobal Algebra and Logic Seminar (PALS), Fall 2020 – present

- Chair of website committee, Fall 2018 – Spring 2022, Fall 2023 – present

- Member of graduate committee, Fall 2016 – Spring 2017, Fall 2023 – present

- Member of hiring plan committee, Fall 2024 – Spring 2025

- Member of the undergraduate committee, Fall 2015 – Spring 2016, Fall 2021 – Spring 2022.

- Elected member of executive committee, Fall 2020 – Spring 2022

- Member of constitution committee, Fall 2019 – Spring 2022

- Member of teaching quality framework, Fall 2018 – Spring 2020

- Co-organizer of the Kempner colloquium, Spring 2016 – Spring 2018.

Professional development at CU Boulder

I attended the following events:
Anti-Blackness Within Non-Black Communities. Workshop at CU Math Department, April 2022.
FTEP: Active learning & group work in classes of any size, January 2019.
FTEP: Flipping the class for the skeptic, September 2018.
FTEP: Preparing a teaching portfolio, February 2018.
FTEP Early Career National Science Group: Undergraduate Teaching, December 2017.
FTEP Early Career National Science Group: Undergraduate Teaching, January 2017.
FTEP Early Career National Science Group: Tenure and Promotion, May 2016.
LEAP's Introductory Leadership Workshop, January 2016.