

Curriculum Vitae

Personal Data

Full name Priv.-Doz. Dipl.-Inf. Dr. Christoph Bernhard Koutschan
Date of birth 12.12.1978
Place of birth Dillingen an der Donau, Germany
Nationality German
Marital status Married, two children

Contact

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Education and Work Experience

05/2017 Habilitation in Mathematics, Johannes Kepler University Linz, Austria.
Thesis: *Quod Erat Demonstrandum: Proofs by Computer*
(evaluation committee: James H. Davenport, Christian Krattenthaler,
Marko Petkovšek, Bruno Salvy, Carsten Schneider, Nobuki Takayama)

09/2012 – Research scientist at the Johann Radon Institute for Computational and
Applied Mathematics (RICAM), Linz, Austria.

09/2011 – 08/2012 Postdoctoral researcher at Institut National de Recherche en Informatique
et en Automatique (INRIA), MSR-INRIA Joint Centre, Orsay, France.

09/2010 – 08/2011 Postdoctoral researcher at the Research Institute for Symbolic Computa-
tion (RISC), Linz, Austria.

10/2009 – 06/2010 Postdoctoral researcher at Tulane University, New Orleans, USA.

10/2005 – 09/2009 Ph.D. studies in symbolic computation at RISC, Johannes Kepler Univer-
sity Linz, Austria.
Ph.D. thesis: *Advanced Applications of the Holonomic Systems Approach*
(advisor: Univ.-Prof. Dr. Peter Paule)

- 10/1999 – 07/2005 Undergraduate studies in computer science (minor subject: mathematics), Friedrich-Alexander University of Erlangen-Nürnberg, Germany.
Diploma thesis: *Regular Languages and Their Generating Function: The Inverse Problem* (advisor: Prof. Dr. Volker Strehl)
- 07/1998 – 07/1999 Civil Service
- 06/1998 High school graduation (Abitur) in Coburg, Germany.

Career-Related Activities

- ▷ session organizer at ICMS 2018
- ▷ program committee member at DART8 (2017)
- ▷ guest editor for Mathematics in Computer Science
- ▷ program committee member at ISSAC 2017
- ▷ session organizer at ACA 2017
- ▷ employee representative at RICAM
- ▷ session organizer at the Workshop on Symbolic Computation and Algebraic Statistics (Kyoto, 2016)
- ▷ session organizer at ICMS (International Congress on Mathematical Software, Berlin, 2016)
- ▷ poster committee member at ISSAC 2016
- ▷ co-organizer (with I. Georgieva, C. Hofreither, V. Pillwein, R. Uluchev) of the Workshop on Approximation Theory, CAGD, Numerical Analysis, and Symbolic Computation (Linz, 2015)
- ▷ co-organizer (with H. Hauser, G. Rond) of the Workshop on Approximation and Combinatorics (CIRM, Luminy, France, 2015)
- ▷ help with conference organization (ISSAC 2008, ACA 2008, FPSAC 2009)
- ▷ conduct one-week workshops for high school students (2007, 2008, 2009)
- ▷ member of DMV and ÖMG
- ▷ reviewer for Zentralblatt MATH and Mathematical Reviews
- ▷ contribute to the Online Encyclopedia of Integer Sequences (OEIS)

Awards

- ▷ 2016 David P. Robbins Prize of the American Mathematical Society (together with M. Kauers and D. Zeilberger)
- ▷ 2016 Distinguished Software Presentation Award at ISSAC

Third-Party Funding

- ▷ Certificate-free Summation and Integration (SFB project part F 5011-N15, 2017–2021, 345,539 EUR)
- ▷ Algebraic Statistics and Symbolic Computation (FWF stand-alone project P 29467-N32, 2016–2018, 155,904 EUR)

Patents

- ▷ Joachim Schöberl, Christoph Koutschan, Peter Paule. *Verfahren, Vorrichtung und Computerprogrammprodukt zur Bestimmung eines elektromagnetischen Nahfeldes einer Feldanregungsquelle eines elektrischen Systems (Method, device and computer program product for determining an electromagnetic near field of a field excitation source for an electrical system)*. European Patent EP2378444, US patent US8868382, 2015.

Publications

- [58] Youssef Abdelaziz, Salah Boukraa, Christoph Koutschan, Jean-Marie Maillard. *Diagonals of rational functions, pullbacked $2F1$ hypergeometric functions and modular forms*. Technical report no. 2018-14 in the RICAM Reports Series, 2018. Submitted for publication. arXiv: [1805.04711](https://arxiv.org/abs/1805.04711).
- [57] Mariemi E. Alonso, Francisco J. Castro-Jiménez, Herwig Hauser, Christoph Koutschan. *Echelons of power series and Gabrielov's counterexample to nested linear Artin approximation*. Bulletin of the London Mathematical Society, 2018. To appear. DOI: [10.1112/blms.12162](https://doi.org/10.1112/blms.12162), arXiv: [1804.08160](https://arxiv.org/abs/1804.08160).
- [56] Youssef Abdelaziz, Salah Boukraa, Christoph Koutschan, Jean-Marie Maillard. *Diagonals of rational functions, pullbacked $2F1$ hypergeometric functions and modular forms (unabridged version)*. Technical report no. 1805.04711 on arXiv, 2018. arXiv: [1805.04711](https://arxiv.org/abs/1805.04711).
- [55] Shaoshi Chen, Christoph Koutschan. *Proof of the Wilf–Zeilberger conjecture for mixed hypergeometric terms*. Journal of Symbolic Computation, 2018. To appear. arXiv: [1507.04840](https://arxiv.org/abs/1507.04840).
- [54] Georg Grasegger, Christoph Koutschan, Elias Tsigaridas. *Lower bounds on the number of realizations of rigid graphs*. Experimental Mathematics, 2018. To appear. DOI: [10.1080/10586458.2018.1437851](https://doi.org/10.1080/10586458.2018.1437851), arXiv: [1710.08237](https://arxiv.org/abs/1710.08237).
- [53] Christoph Koutschan, Yi Zhang. *Desingularization in the q -Weyl algebra*. Advances in Applied Mathematics **97**, pp. 80–101, 2018. DOI: [10.1016/j.aam.2018.02.005](https://doi.org/10.1016/j.aam.2018.02.005), arXiv: [1801.04160](https://arxiv.org/abs/1801.04160).
- [52] Jose Capco, Matteo Gallet, Georg Grasegger, Christoph Koutschan, Niels Lubbes, Josef Schicho. *The number of realizations of a Laman graph*. SIAM Journal on Applied Algebra and Geometry **2**(1), pp. 94–125, 2018. DOI: [10.1137/17M1118312](https://doi.org/10.1137/17M1118312), arXiv: [1701.05500](https://arxiv.org/abs/1701.05500).
- [51] Shaoshi Chen, Mark van Hoeij, Manuel Kauers, Christoph Koutschan. *Reduction-based creative telescoping for fuchsian D -finite functions*. Journal of Symbolic Computation **85**, pp. 108–127, 2018. DOI: [10.1016/j.jsc.2017.07.005](https://doi.org/10.1016/j.jsc.2017.07.005), arXiv: [1611.07421](https://arxiv.org/abs/1611.07421).
- [50] Christoph Koutschan, Peter Paule. *Holonomic tools for basic hypergeometric functions*. In *Frontiers in Orthogonal Polynomials and q -Series*, pp. 393–416, 2018. World Scientific, ISBN 978-981-3228-87-0. DOI: [10.1142/9789813228887_0020](https://doi.org/10.1142/9789813228887_0020), arXiv: [1602.00454](https://arxiv.org/abs/1602.00454).
- [49] Christoph Koutschan, Thotsaporn Thanatipanonda. *A curious family of binomial determinants that count rhombus tilings of a holey hexagon*. Technical report no. 2017-30 in the RICAM Reports Series, 2017. Submitted for publication. arXiv: [1709.02616](https://arxiv.org/abs/1709.02616).
- [48] Jose Capco, Matteo Gallet, Georg Grasegger, Christoph Koutschan, Niels Lubbes, Josef Schicho. *Computing the number of realizations of a Laman graph*. Electronic Notes in Discrete Mathematics (Proceedings of Eurocomb 2017) **61**, pp. 207–213, 2017. DOI: [10.1016/j.endm.2017.06.040](https://doi.org/10.1016/j.endm.2017.06.040), arXiv: [1707.03633](https://arxiv.org/abs/1707.03633).
- [47] Johannes Middeke, David J. Jeffrey, Christoph Koutschan. *Common factors in fraction-free matrix decompositions*. Technical report no. 2017-42 in the RICAM Reports Series, 2017. Submitted for publication.

- [46] Matteo Gallet, Christoph Koutschan, Zijia Li, Georg Regensburger, Josef Schicho, Nelly Villamizar. *Planar linkages following a prescribed motion*. Mathematics of Computation **86**, pp. 473–506, 2017. DOI: [10.1090/mcom/3120](https://doi.org/10.1090/mcom/3120), arXiv: [1502.05623](https://arxiv.org/abs/1502.05623).
- [45] Thomas Cluzeau, Christoph Koutschan, Alban Quadrat, Maris Tönso. *Effective algebraic analysis approach to linear systems over Ore algebras*. Technical report no. 2017-12 in the RICAM Reports Series, 2017. Submitted for publication.
- [44] Christoph Koutschan. *Motion polynomials and planar linkages*. ACM Communications in Computer Algebra **50**(3), pp. 109–112, 2016. DOI: [10.1145/3015306.3015315](https://doi.org/10.1145/3015306.3015315).
- [43] Christoph Koutschan, Martin Neumüller, Cristian-Silviu Radu. *Inverse inequality estimates with symbolic computation*. Advances in Applied Mathematics **80**, pp. 1–23, 2016. DOI: [10.1016/j.aam.2016.04.005](https://doi.org/10.1016/j.aam.2016.04.005), arXiv: [1602.01304](https://arxiv.org/abs/1602.01304).
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- [41] Saoud Hassani, Christoph Koutschan, Jean-Marie Maillard, Nadjah Zenine. *Lattice Green functions: the d -dimensional face-centred cubic lattice, $d = 8, 9, 10, 11, 12$* . Journal of Physics A: Mathematical and Theoretical **49**(16), 164003, 2016. DOI: [10.1088/1751-8113/49/16/164003](https://doi.org/10.1088/1751-8113/49/16/164003), arXiv: [1601.05657](https://arxiv.org/abs/1601.05657).
- [40] Constantin Siriteanu, Akimichi Takemura, Christoph Koutschan, Satoshi Kuriki, Donald St. P. Richards, Hyundong Shin. *Exact ZF analysis and computer-algebra-aided evaluation in rank-1 LoS Rician fading*. IEEE Transactions on Wireless Communications **15**(8), pp. 5245–5259, 2016. DOI: [10.1109/TWC.2016.2555796](https://doi.org/10.1109/TWC.2016.2555796), arXiv: [1507.07056](https://arxiv.org/abs/1507.07056).
- [39] Christoph Koutschan, Erwin Suazo, Sergei K. Suslov. *Fundamental laser modes in paraxial optics: from computer algebra and simulations to experimental observation*. Applied Physics B: Lasers and Optics **121**(3), pp. 315–336, 2015. DOI: [10.1007/s00340-015-6231-9](https://doi.org/10.1007/s00340-015-6231-9), arXiv: [1407.0730](https://arxiv.org/abs/1407.0730).
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- [36] Constantin Siriteanu, Akimichi Takemura, Satoshi Kuriki, Hyundong Shin, Christoph Koutschan. *MIMO zero-forcing performance evaluation using the holonomic gradient method*. IEEE Transactions on Wireless Communications **14**(4), pp. 2322–2335, 2015. DOI: [10.1109/TWC.2014.2385075](https://doi.org/10.1109/TWC.2014.2385075), arXiv: [1403.3788](https://arxiv.org/abs/1403.3788).
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- [34] Christoph Koutschan, Peter Paule, Sergei K. Suslov. *Relativistic Coulomb integrals and Zeilberger’s holonomic systems approach II*. In *Algebraic and Algorithmic Aspects of Differential and Integral Operators*, Lecture Notes in Computer Science **8372**, pp. 135–145, 2014. Springer-Verlag, Berlin Heidelberg, ISBN 978-3-642-54478-1. DOI: [10.1007/978-3-642-54479-8_6](https://doi.org/10.1007/978-3-642-54479-8_6), arXiv: [1306.1362](https://arxiv.org/abs/1306.1362).

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- [31] Stefan Gerhold, Manuel Kauers, Christoph Koutschan, Peter Paule, Carsten Schneider, Burkhard Zimmermann. *Computer-assisted proofs of some identities for Bessel functions of fractional order*. In Carsten Schneider, Johannes Blümlein (editors): *Computer Algebra in Quantum Field Theory: Integration, Summation and Special Functions*, Texts & Monographs in Symbolic Computation, pp. 75–96, 2013. Springer, Wien, ISBN 978-3-7091-1615-9. DOI: [10.1007/978-3-7091-1616-6_3](https://doi.org/10.1007/978-3-7091-1616-6_3), arXiv: [1305.4818](https://arxiv.org/abs/1305.4818).
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- [29] Christoph Koutschan. *Lattice Green’s functions of the higher-dimensional face-centered cubic lattices*. Journal of Physics A: Mathematical and Theoretical **46**(12), 125005, 2013. DOI: [10.1088/1751-8113/46/12/125005](https://doi.org/10.1088/1751-8113/46/12/125005), arXiv: [1108.2164](https://arxiv.org/abs/1108.2164).
- [28] Christoph Koutschan, Thotsaporn Thanatipanonda. *Advanced computer algebra for determinants*. Annals of Combinatorics **17**(3), pp. 509–523, 2013. DOI: [10.1007/s00026-013-0183-8](https://doi.org/10.1007/s00026-013-0183-8), arXiv: [1112.0647](https://arxiv.org/abs/1112.0647).
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- [25] Larry Glasser, Karen T. Kohl, Christoph Koutschan, Victor H. Moll, Armin Straub. *The integrals in Gradshteyn and Ryzhik. Part 22: Bessel- K functions*. SCIENTIA Series A: Mathematical Sciences **22**, pp. 129–151, 2012.
- [24] Herwig Hauser, Christoph Koutschan. *Multivariate linear recurrences and power series division*. Discrete Mathematics **312**(24), pp. 3553–3560, 2012. DOI: [10.1016/j.disc.2012.08.009](https://doi.org/10.1016/j.disc.2012.08.009).
- [23] Thierry Combot, Christoph Koutschan. *Third order integrability conditions for homogeneous potentials of degree -1* . Journal of Mathematical Physics **53**(8), 082704, 2012. DOI: [10.1063/1.4746691](https://doi.org/10.1063/1.4746691), arXiv: [1111.5971](https://arxiv.org/abs/1111.5971).
- [22] Masao Ishikawa, Christoph Koutschan. *Zeilberger’s holonomic ansatz for Pfaffians*. In *Proceedings of the International Symposium on Symbolic and Algebraic Computation (ISSAC)*, pp. 227–233, 2012. ACM, New York, USA, ISBN 978-1-4503-1269. DOI: [10.1145/2442829.2442863](https://doi.org/10.1145/2442829.2442863), arXiv: [1201.5253](https://arxiv.org/abs/1201.5253).
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- [10] Christoph Koutschan. *A fast approach to creative telescoping*. *Mathematics in Computer Science* **4**(2-3), pp. 259–266, 2010. DOI: [10.1007/s11786-010-0055-0](https://doi.org/10.1007/s11786-010-0055-0), arXiv: [1004.3314](https://arxiv.org/abs/1004.3314).
- [9] Christoph Koutschan. *HolonomicFunctions (user's guide)*. Technical report no. 10-01 in the RISC Report Series, Johannes Kepler University, Linz, Austria, 2010.
- [8] Christoph Koutschan. *Advanced applications of the holonomic systems approach*. *ACM Communications in Computer Algebra* **43**(3/4), pp. 119–119, 2009. DOI: [10.1145/1823931.1823954](https://doi.org/10.1145/1823931.1823954).
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- [6] Manuel Kauers, Christoph Koutschan, Doron Zeilberger. *A Proof of George Andrews' and Dave Robbins' q -TSPP conjecture (modulo a finite amount of routine calculations)*. The personal journal of Shalosh B. Ekhad and Doron Zeilberger, 2009.

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- [3] Christoph Koutschan, Viktor Levandovskyy. *Computing one of Victor Moll's irresistible integrals with computer algebra*. Computer Science Journal of Moldova **16**(1(46)), pp. 35–49, 2008.
- [2] Christoph Koutschan. *Regular languages and their generating functions: the inverse problem*. Theoretical Computer Science **391**(1-2), pp. 65–74, 2008. DOI: [10.1016/j.tcs.2007.10.031](https://doi.org/10.1016/j.tcs.2007.10.031).
- [1] Christoph Koutschan. *Regular languages and their generating functions: the inverse problem*. Master thesis (Diplomarbeit), Friedrich-Alexander-Universität, Erlangen-Nürnberg, Germany, 2005.

Talks at Conferences

52. *Symbolic evaluation of determinants and rhombus tilings of holey hexagons*. Contributed talk at the Workshop on Enumerative Combinatorics, Mathematisches Forschungsinstitut Oberwolfach, Germany, May 15, 2018.
51. *Symbolic evaluation of determinants and rhombus tilings of holey hexagons*. Invited talk at the Workshop on Computer Algebra in Combinatorics, Erwin Schrödinger Institut (ESI), Vienna, Austria, November 16, 2017.
50. *Computer Algebra in the q-Calculus*. Invited talk at the Combinatorics meeting on the occasion of Johann Cigler's 80. birthday, University of Vienna, Austria, October 25, 2017.
49. *Symbolic evaluation of determinants and rhombus tilings of holey hexagons*. Invited talk at the ALEA in Europe Workshop, Technical University of Vienna, Austria, October 12, 2017.
48. *Reduction-based creative telescoping for D-finite functions*. Invited talk at Lattice walks at the Interface of Algebra, Analysis and Combinatorics, Banff International Research Station, Canada, September 19, 2017.
47. *Computing the number of realizations of Laman graphs*. Invited talk at the Workshop on Computational Mathematics and Approximation Theory (CMAPT), RICAM, Linz, Austria, September 8, 2017.
46. *Constructing linkages for drawing plane curves*. Invited talk at ACA (23rd Conference on Applications of Computer Algebra), Jerusalem College of Technology, Jerusalem, Israel, July 21, 2017.
45. *Two facets of computational mathematics: numerics and symbolics*. Invited talk at the ERCOM Meeting, RICAM, Austria, April 28, 2017.
44. *Reduction-based creative telescoping for algebraic functions*. Invited talk at the Workshop on Algebraic Statistics and Symbolic Computation, Research Institute for Mathematical Sciences (RIMS), Kyoto University, Japan, July 28, 2016.
43. *Inverse inequality estimates with symbolic computation*. Invited talk at the Waterloo Workshop on Computer Algebra, Wilfrid Laurier University, Waterloo, Canada, July 23, 2016.
42. *Motion polynomials and planar linkages*. Software presentation at ISSAC (41st International Symposium on Symbolic and Algebraic Computation), Wilfrid Laurier University, Waterloo, Canada, July 20, 2016.

41. *Minimally rigid graphs*. Invited talk at MICA (Milestones in Computer Algebra — Celebrating the Research of Erich Kaltofen), University of Waterloo, Canada, July 16, 2016.
40. *Effective algebraic analysis approach to linear systems over Ore algebras*. Invited talk at ICMS (5th International Congress on Mathematical Software), Zuse Institute Berlin, Germany, July 12, 2016.
39. *Inverse inequality estimates with symbolic computation*. Invited talk at the Workshop on Analysis and Advanced Numerical Methods for Partial Differential Equations, Strobl, Austria, July 8, 2016.
38. *Symbolic determinant evaluation*. Invited talk at the Workshop on Algebra, Geometry and Proofs in Symbolic Computation, Fields Institute, Toronto, Canada, December 15, 2015.
37. *Planar linkages following a prescribed motion*. Invited talk at the Workshop on Approximation Theory, CAGD, Numerical Analysis, and Symbolic Computation, Linz, Austria, August 25, 2015.
36. *Pushing forward the dimension of fcc lattices*. Invited talk at the Sixth International Workshop on Differential Algebra and Related Topics (DART-VI, embedded conference of ICIAM), China National Convention Center, Beijing, China, August 10, 2015.
35. *Computer-algebra-based MIMO performance analysis*. Invited talk at the SIAM Conference on Applied Algebraic Geometry, National Institute for Mathematical Sciences (NIMS), Daejeon, South Korea, August 7, 2015.
34. *Pushing forward the dimension of fcc lattices*. Invited talk at SIAM-OPSFA (13th International Symposium on Orthogonal Polynomials, Special Functions & Applications), National Institute of Standards and Technology (NIST), Gaithersburg, USA, June 2, 2015.
33. *Multivariate D -finite and holonomic functions*. Invited talk at the Workshop on Approximation and Combinatorics, Centre international de rencontres mathématiques (CIRM), Luminy, France, April 23, 2015.
32. *Planar linkages following a prescribed motion*. Invited talk at the Computer Algebra Seminar, Kobe University, Japan, March 8, 2015.
31. *Software demo: the HolonomicFunctions package*. Invited talk at the Workshop on computational and algebraic methods in statistics, University of Tokyo, Japan, March 3, 2015.
30. *q -shift operators in knot theory*. Invited talk at the Symbolic Analysis Workshop at FoCM (Foundations of Computational Mathematics), Universidad de la República, Montevideo, Uruguay, December 16, 2014.
29. *Creative telescoping*. Invited talk at the Workshop on geometric control and related fields, RICAM, Linz, Austria, November 17, 2014.
28. *Symbolic computation in knot theory*. Invited talk at the Workshop on Approximation Theory, CAGD, Numerical Analysis, and Symbolic Computation, Sozopol, Bulgaria, August 27, 2014.
27. *A generalized Apagodu-Zeilberger algorithm*. Contributed talk at ISSAC (39th International Symposium on Symbolic and Algebraic Computation), Kobe University, Japan, July 23, 2014.
26. *On the AJ conjecture of connected sums of knots*. Invited talk at the Programme on Combinatorics, Geometry, and Physics, Erwin Schrödinger Institut (ESI), Vienna, Austria, July 17, 2014.
25. *A rational perspective on holonomic functions*. Invited talk at CASTA (Computational Algebraic Statistics, Theories and Applications), Kyoto, Japan, January 22, 2014.
24. *A glimpse of noncommutative Gröbner bases*. Invited talk at the conference Gröbner Bases, Resultants and Linear Algebra, RISC, Johannes Kepler University Linz, Austria, September 6, 2013.

23. *Holonomic functions in Mathematica*. Software presentation at ISSAC (38th International Symposium on Symbolic and Algebraic Computation), Northeastern University, Boston, Massachusetts, USA, June 27, 2013.
22. *Holonomicity and properness are equivalent*. Contributed talk at LARD (Linz Algebra Research Day), Johannes Kepler University Linz, Austria, June 19, 2013.
21. *Zeilberger's holonomic ansatz for Pfaffians*. Contributed talk at ISSAC (37th International Symposium on Symbolic and Algebraic Computation), University of Grenoble, France, July 24, 2012.
20. *Twisting q -holonomic sequences by complex roots of unity*. Contributed talk at ISSAC (37th International Symposium on Symbolic and Algebraic Computation), University of Grenoble, France, July 23, 2012.
19. *Twisting q -holonomic sequences by complex roots of unity*. Invited talk at ACA (18th International Conference on Applications of Computer Algebra), Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences, Sofia, Bulgaria, June 28, 2012.
18. *The face-centered cubic lattice*. Invited talk at FELIM (Functional Equations in LIMoges), Faculty of Sciences and Techniques of the University of Limoges, France, March 5, 2012.
17. *Advanced computer algebra for evaluating determinants*. Contributed talk at JNCF (Journées Nationales de Calcul Formel), CIRM Luminy (Marseille), France, November 16, 2011.
16. *Lattice Green's functions of the higher-dimensional face-centered cubic lattices*. Invited talk at the Conference on Applied Algebraic Geometry (Minisymposium "Symbolic Combinatorics"), North Carolina State University, Raleigh, North Carolina, USA, October 6, 2011.
15. *Lattice Green's functions of the higher-dimensional face-centered cubic lattices*. Invited talk at CSASC (Joint Mathematical Conference of the Austrian Mathematical Society together with the Catalan, Czech, Slovak, and Slovenian Mathematical Societies, Minisymposium "Combinatorics and Graph Theory"), Donau-Universität Krems, Austria, September 27, 2011.
14. *Lattice Green's functions*. Invited talk at ACA (17th International Conference on Applications of Computer Algebra), Lamar University, Houston, Texas, USA, June 28, 2011.
13. *Software for special functions*. Invited talk at ICASF (International Conference on Asymptotics and Special Functions), City University of Hong Kong, China, June 1, 2011.
12. *Computer algebra tools for summation and integration*. Invited talk at CMIC (Chiang Mai International Conference), Chiang Mai University, Thailand, January 6, 2011.
11. *Algorithmic combinatorics: symbolic summation and integration*. Tutorial at CMIC (Chiang Mai International Conference), Chiang Mai University, Thailand, January 4–5, 2011.
10. *Proof of the q -TSP Conjecture*. Contributed talk at SLC 65 (Séminaire Lotharingien de Combinatoire), Strobl, Austria, September 13, 2010.
9. *Proof of George Andrews' and David Robbins' q -TSP Conjecture*. Contributed talk at the Conference in Honor of Doron Zeilberger's 60th Birthday, Rutgers University, New Jersey, USA, May 27, 2010.
8. *HolonomicFunctions*. Software presentation at FPSAC (21st International Conference on Formal Power Series and Algebraic Combinatorics), RISC, Johannes Kepler University Linz, Austria, July 22, 2009.
7. *Think Big (or how to tackle hard problems with the holonomic systems approach)*. Invited talk at the Summation Workshop, RISC, Johannes Kepler University Linz, Austria, July 19, 2009.
6. *Algorithmic proving of special function identities in Mathematica*. Invited talk at ACA (15th International Conference on Applications of Computer Algebra), École de technologie supérieure, Montréal, Canada, June 26, 2009.

5. *A difference operators attack on hard combinatorial problems.* Invited talk at ACA (15th International Conference on Applications of Computer Algebra), École de technologie supérieure, Montréal, Canada, June 25, 2009.
4. *How to prove the q -TSP Conjecture?* Invited talk at the AMS Joint Mathematics Meeting, Washington DC, USA, January 5, 2009.
3. *Proof of Ira Gessel's lattice path conjecture.* Contributed talk at SLC 61 (Séminaire Lotharingien de Combinatoire), Curia, Portugal, September 24, 2008.
2. *Holonomic function identities.* Invited talk at ACA (14th International Conference on Applications of Computer Algebra), RISC, Johannes Kepler University Linz, Austria, July 27, 2008.
1. *Proof of Ira Gessel's lattice path conjecture.* Invited talk at SNSC (4th International Conference on Symbolic and Numerical Scientific Computing), RISC, Johannes Kepler University Linz, Austria, July 25, 2008.

Peer-Reviewing Activities

For each journal and conference the number of completed reviews is given in parentheses.

- ▷ ISSAC (15)
- ▷ Journal of Symbolic Computation (7)
- ▷ Journal of Physics A: Mathematical and Theoretical (6)
- ▷ Journal of Mathematical Analysis and Applications (4)
- ▷ Advances in Applied Mathematics (2)
- ▷ CASC (2)
- ▷ Electronic Journal of Combinatorics (2)
- ▷ Journal of Combinatorial Theory, Series A (2)
- ▷ Acta Physica Polonica A (1)
- ▷ Ain Shams Engineering Journal (1)
- ▷ Ars Mathematica Contemporanea (1)
- ▷ Applicable Algebra in Engineering, Communication and Computing (1)
- ▷ European Journal of Combinatorics (1)
- ▷ Fluctuation and Noise Letters (1)
- ▷ Foundations of Computational Mathematics (1)
- ▷ FPSAC (1)
- ▷ International Journal of Computer Mathematics (1)
- ▷ International Journal of Theoretical Physics (1)
- ▷ Inventiones Mathematicae (1)
- ▷ Journal of Computer and System Sciences (1)
- ▷ Journal of Integer Sequences (1)
- ▷ Journal of Number Theory (1)
- ▷ Journal of the London Mathematical Society (1)
- ▷ Lecture Notes in Computer Science (1)
- ▷ L'Enseignement Mathématique (1)
- ▷ Mathematical Methods in the Applied Sciences (1)
- ▷ Reports on Mathematical Physics (1)

- ▷ SIGMA (1)
- ▷ Theoretical Computer Science (1)
- ▷ Transactions of the AMS (1)

Teaching

Semester	School	Type	Title
S 2018	JKU	Lecture	Mathematik 2 für Mechatronik, Kunststofftechnik, Elektronik und Informationstechnik
	FHH	Lecture	Mathematik 1 – Algebra
W 2017	JKU	Lecture	Mathematik 1 für Mechatronik, Kunststofftechnik, Elektronik und Informationstechnik
	FHH	Lecture	Logische und formale Grundlagen der Informatik
S 2017	JKU	Exercises	Algebra für InformatikerInnen
	FHH	Lecture	Mathematik 1 – Algebra
W 2016	FHH	Lecture	Logische und formale Grundlagen der Informatik
S 2016	JKU	Exercises	Lineare Algebra und Analytische Geometrie 2
	FHH	Lecture	Mathematik 1 – Algebra
W 2015	JKU	Exercises	Lineare Algebra und Analytische Geometrie 1
	JKU	Exercises	Mathematik und Logik für Wirtschaftsinformatiker
	FHH	Lecture	Logische und formale Grundlagen der Informatik
S 2015	FHH	Lecture	Mathematik 1 – Algebra
W 2014	FHH	Lecture	Logische und formale Grundlagen der Informatik
W 2013	JKU	Lecture	Knot Theory and Computer Algebra
	JKU	Exercises	Analysis (Mathematik 2 für Informatiker)
	FHH	Lecture	Logische und formale Grundlagen der Informatik
W 2012	JKU	Exercises	Analysis (Mathematik 2 für Informatiker)
	FHH	Lecture	Logische und formale Grundlagen der Informatik
W 2011	FHH	Lecture	Logische und formale Grundlagen der Informatik
W 2010	JKU	Lecture	Computer Algebra Systems
	JKU	Exercises	Analysis (Mathematik 2 für Informatiker)
	FHH	Exercises	Logische und formale Grundlagen der Informatik
W 2008	JKU	Lecture	Computer Algebra Systems
	JKU	Exercises	Analysis für Informatiker
W 2007	JKU	Exercises	Berechenbarkeit und Komplexität
S 2007	JKU	Exercises	Analysis für Informatiker
W 2006	JKU	Exercises	Formale Grundlagen 2
S 2005	FAU	Exercises	Einführung in die Theoretische Informatik II
S 2004	FAU	Exercises	Einführung in die Theoretische Informatik III
W 2003	FAU	Exercises	Einführung in die Theoretische Informatik II
	FAU	Exercises	Mathematik für Ingenieure I
S 2003	FAU	Exercises	Einführung in die Theoretische Informatik III

W 2002	FAU	Exercises	Mathematik für Ingenieure III
	FAU	Exercises	Organisation und Technologie von Rechensystemen I
S 2002	FAU	Exercises	Mathematik für Ingenieure II
W 2001	FAU	Exercises	Mathematik für Ingenieure I

FAU = Friedrich-Alexander-Universität Erlangen-Nürnberg

FHH = Fachhochschule Hagenberg

JKU = Johannes Kepler Universität Linz

Software

- ▷ **LamanGraphs**, a Mathematica package and C++ implementation for constructing Laman graphs and for computing their embedding numbers.
- ▷ **PlanarLinkages**, a Mathematica package for constructing and visualizing planar linkages that follow a prescribed curve (or motion), including arithmetic and factorization of motion polynomials.
- ▷ Member of the development team of DDMF (Dynamic Dictionary of Mathematical Functions), see <http://ddmf.msr-inria.inria.fr>.
- ▷ **GradshteynRyzhik**, a package for extracting all formulas from the book by Gradshteyn and Ryzhik, and for translating them into the Mathematica language.
- ▷ **HolonomicFunctions**, a Mathematica package for dealing with multivariate holonomic functions and sequences, in particular for executing closure properties, evaluating sums and integrals involving special functions, finding relations for a given function, etc.
- ▷ **qGeneratingFunctions**, a Mathematica package for manipulations of univariate q -holonomic functions and sequences.
- ▷ **RLangGFun**, a Maple implementation of the inverse Schützenberger methodology (a constructive version of Soittola's Theorem).

Personal Interests

- ▷ Music: piano lessons (1986 – 1992), lessons in church organ (1992 – 2005), degrees D-diploma (1998) and C-diploma (2003) in church music, regular playing in church services.
- ▷ Singing: member of the *Academic Choir* of the FA University of Erlangen-Nürnberg (2002 – 2005), member of the choir *pro musica* (since 2005).
- ▷ Photography: using a professional SLR camera
- ▷ Travel: various journeys to many different countries, mainly in Asia, Latin America, and Europe.
- ▷ Languages: Latin (7 years), English (7 years), French (3 years) in high school. Basic courses in Chinese and Russian at university, and studies of the Arabic language (2004 – 2005), including a one-month language course in Lebanon.