

Curriculum Vitae

Uli Wagner

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Personal Information

Date of birth: June 5, 1975
Place of birth: Kassel, Germany
Citizenship: German

Positions

since 03/2013 Assistant Professor, IST Austria
07/2012 – 02/2013 SNSF Research Assistant Professor, Institut de Mathématiques de Géométrie et Applications (MATHGEOM), École Polytechnique Fédérale de Lausanne
09/2008 – 06/2012 Senior Research Associate (*Oberassistent*), Institute of Theoretical Computer Science, Eidgenössische Technische Hochschule Zürich
08/2011 – 10/2011 Research Member, Mathematical Sciences Research Institute, Berkeley
04/2006 – 08/2008 Postdoctoral Researcher, Institute of Theoretical Computer Science, Eidgenössische Technische Hochschule Zürich
09/2004 – 02/2006 Postdoctoral Fellow, Einstein Institute for Mathematics, The Hebrew University of Jerusalem
01/2004 – 08/2004 Postdoctoral Fellow, Department for Applied Mathematics, Univerzita Karlova, Prague
08/2003 – 12/2003 Fellow, Mathematical Sciences Research Institute, Berkeley

Education

2000 – 2004 Ph.D. in Mathematics, Eidgenössische Technische Hochschule, Zürich
1999 – 2000 Visiting Student, Eidgenössische Technische Hochschule, Zürich.
1997 – 1998 Visiting Student, University of California, Los Angeles.
1995 – 2000 Diplom in Mathematics, Freie Universität Berlin.

Honors and Awards

- Richard Rado Prize 2004
- Best Paper Award at the *Symposium of Discrete Algorithms (SODA)* 2012 for the paper *Computing all maps into a sphere* (joint with M. Čadek, M. Krčál, J. Matoušek, F. Sergeraert, and L. Vokřínek).
- Best Paper Award at the *Symposium of Computational Geometry (SoCG)* 2014 for the paper *Embeddability in the 3-sphere is decidable* (joint with J. Matoušek, E. Sedgwick, and M. Tancer).

Grants

- SNSF Research Assistant Professorship PP00P2-138948, *Embeddings in Higher Dimensions: Algorithms and Combinatorics*
- SNSF Project 200021-116741, *Geometric, Algebraic, and Topological Invariants for k -Facets and Levels in Arrangements*
- SNSF Project 20020-125027, *k -Sets and Geometric Graphs*
- SNSF Project 200021-125309, *Combinatorial and Computational Aspects of Embeddability*
- SNSF Project 200020-138230, *Minors and Embeddability of Simplicial Complexes*

Professional Service

- Programm Committee European Symposium on Algorithms (ESA) 2009
- Program Committee International Colloquium on Automata, Languages and Programming (ICALP), Track A (Algorithms, Complexity and Games) 2011.
- Programm Committee Symposium on Computational Geometry (SoCG) 2013.
- Programm Committee European Workshop on Computational Geometry (EuroCG) 2015.

Selected Invited Talks

- *Learning about Manifolds from Samples*, invited talk at the workshop *Mathematical Foundations of Geometric Algorithms*, Mathematical Sciences Research Institute, Berkeley, USA, October 2003.
- *k -Sets, Crossing Numbers, and the Upper Bound Theorem*, invited talk at the *Annual Symposium of the Discrete Mathematics Section of the German Mathematical Society*, ETH Zürich, Switzerland, November 2004.
- *Combinatorial and Computational Aspects of Embeddability*, invited talk at *Combinatorics: Methods & Applications – Combinatorial Geometry Workshop*, Institute for Pure & Applied Mathematics (IPAM), University of California, Los Angeles, USA, October 2009.
- *Minors and Embeddability of Simplicial Complexes*, invited talk at the *Conference on Geometric Graph Theory*, EPFL, Lausanne, Switzerland, October 2010.
- *Isoperimetric Inequalities in the Simplex and Multiplicities of Maps, after Gromov*, invited talk at the ERC Workshop *High-Complexity Discrete Geometry*, Freie Universität Berlin, Germany, October 2011.
- *Eigenvalues of Random Complexes*, invited talk at the *Bernoulli Reunion Conference on Discrete and Computational Geometry*, EPFL, Lausanne, Switzerland, February/March 2012.
- *A Primer on Higher-Dimensional Expansion Properties*, invited talk at the 48th Netherlands Mathematical Congress (Geometry Section), TU Eindhoven, the Netherlands, April 2012.
- *Computational and Combinatorial Aspects of Embeddings*, invited talk at the conference *Applied Topology*, Będlewo, Poland, July 2013
- *Combinatorial and Algorithmic Aspects of Embeddings*, invited talk at the conference *Geometry and Topology of Networks and Discrete Metric Spaces*, Institute for Mathematics and its Applications (IMA), Minneapolis, USA, April 2014.
- *Eliminating Multiple Intersections and Tverberg Points*, invited talk at the conference *Discrete, Computational and Algebraic Topology*, University of Copenhagen, Denmark, November 2014.
- *Eliminating Tverberg Points*, invited talk at workshop *Discrete Models in Geometry and Topology*, FU Berlin, Germany, March 2015.

Publications

Uli Wagner

Original Publications in Peer-Reviewed Journals

- [1] Uli Wagner and Emo Welzl. *A continuous analogue of the Upper Bound Theorem*. Discrete Comput. Geom. 26 (2001), 205–219.
Extended abstract “*Origin-embracing distributions, or a continuous analogue of the upper bound theorem*” in Proc. 16th Symp. Comput. Geom. (SoCG), 2000, 50–56.
- [2] Uli Wagner. *On the number of corner cuts*. Adv. in Appl. Math. 29 (2002), 152–161.
- [3] Jiří Matoušek and Uli Wagner. *New constructions of weak epsilon-nets*. Discrete Comput. Geom. 32(2), 2004, 195–206.
Extended abstract in Proc. 19th Symp. Comput. Geom. (SoCG), 2003, 129–135.
- [4] Joachim Giesen and Uli Wagner. *Shape dimension and intrinsic metric from samples of manifolds*. Discrete Comput. Geom. 32(2), 2004, 245–267.
Extended abstract in Proc. 19th Symp. Comput. Geom. (SoCG), 2003, 329–337.
- [5] Christoph Ambühl and Uli Wagner, *The Clique Problem in Intersection graphs of ellipses and triangles*. Theory Comput. Syst. 38(2), 2005, 279–292.
Extended abstract in Proc. 13th Int. Symp. on Algorithms and Computation (ISAAC), 2002, 489–500.
- [6] Jiří Matoušek, Micha Sharir, Shakhar Smorodinsky, and Uli Wagner. *k-Sets in 4 dimensions*. Discrete Comput. Geom. 35(2), 2006, 177–191.
- [7] Ke Chen, Amos Fiat, Haim Kaplan, Meital Levy, Jiří Matoušek, Elchanan Mossel, János Pach, Micha Sharir, Shakhar Smorodinsky, Uli Wagner, and Emo Welzl, *Online conflict-free coloring for intervals*. *Siam Journal of Computing* 36(5), 2006, 1342–1359.
Extended abstract in Proc. 16th Symp. Discrete Algorithms (SODA), 2005, 545–545.
- [8] Kevin Buchin, Andreas Razen, Takeaki Uno, and Uli Wagner. *Transforming spanning trees: a lower bound*. Comput. Geom. 42(8), 2009, 724–730.
- [9] Eran Nevo and Uli Wagner. *On the Embeddability of Skeletons of Spheres*. Israel J. Math. 174, 2009, 381–402.
- [10] Jiří Matoušek, Martin Tancer, and Uli Wagner. *Hardness of embedding simplicial complexes in \mathbf{R}^d* . J. Eur. Math. Soc. 13(2), 2011, 259–295.
Extended abstract in Proc. 20th Symp. Discrete Algorithms (SODA), 2009, 855–864.
- [11] Jiří Matoušek, Martin Tancer, and Uli Wagner. *A geometric proof of the colored Tverberg theorem*. Discrete Comput. Geom. 47(2), 2012, 245–265.

- [12] Dan Chen, Pat Morin, and Uli Wagner. *Absolute approximation of Tukey depth: Theory and experiments*. *Comput. Geom.* 46(5), 2012, 566–573.
- [13] Jiří Matoušek and Uli Wagner. *On Gromov’s method of selecting heavily covered points*. *Discrete Comput. Geom.* 52(1), 2014, 1–33.
- [14] Martin Čadek, Marek Krčál, Jiří Matoušek, Lukáš Vokřínek, and Uli Wagner. *Extendability of Continuous Maps Is Undecidable*. *Discrete Comput. Geom.* 51(1), 2014, 24–66.
- [15] Martin Čadek, Marek Krčál, Jiří Matoušek, Francis Sergeraert, Lukáš Vokřínek, and Uli Wagner. *Computing all maps into a sphere*. *J. ACM* 61(3), 2014, Art. 17 (44 pages).
Extended abstract in *Proc. 23rd Symp. Discrete Algorithms (SODA)*, 2012, 1–10.
- [16] Martin Čadek, Marek Krčál, Jiří Matoušek, Lukáš Vokřínek, and Uli Wagner. *Polynomial-time computation of homotopy groups and Postnikov systems in fixed dimension*. *SIAM J. Comput.* 43(5), 2014, 1728–1780.
Extended abstract “*Extending Continuous Maps: Polynomiality and Undecidability*” (of both [16] and [14]) in *Proc. 45th Symp. Theory Computing (STOC)*, 2013, 595–604.
- [17] Jiří Matoušek, Eric Sedgwick, Martin Tancer, and Uli Wagner. *Untangling two systems of noncrossing curves*. *Israel J. Math.* to appear.
Extended abstract in *Proc. 21st Symp. Graph Drawing*, 2013, 472–483.
- [18] Anna Gundert and Uli Wagner. *On Topological Minors in Random Simplicial Complexes*. *Proc. Amer. Math. Soc.* 144 (2016), 1815–1828
- [19] Anna Gundert and Uli Wagner. *Eigenvalues of Random Complexes*. *Israel J. Math.* to appear.
Extended abstract “*Laplacians of Random Complexes*” in *Proc. 28th Symp. Comput. Geom. (SoCG)*, 2012, 151–160.

Original Publications in Peer-Reviewed Monographs

The following original research paper appeared, as an invited paper, in a special volume and underwent the same refereeing process as a journal publication.

- [20] László Lovász, Katalin Vesztegombi, Uli Wagner, and Emo Welzl. *Convex quadrilaterals and k -sets*. In *Towards a Theory of Geometric Graphs* (János Pach, ed.), *Contemp. Math.* 342, American Mathematical Society, Providence, 2004, 139–148.

Original Publications in Peer-Reviewed Proceedings

- [21] Uli Wagner. *On the Rectilinear Crossing Number of Complete Graphs*. *Proc. 14th Symp. Discrete Algorithms (SODA)*, 2003, 583–588.
- [22] Uli Wagner. *On a Generalization of the Upper Bound Theorem*. *Proc. 47th Symp. Foundations of Computer Science (FOCS)*, 2006, 635–645.
- [23] Shakhbar Smorodinsky, Marek Sulovský, and Uli Wagner. *On Center Regions and Balls Containing Many Points*. *Proc. 14th Conf. Computing and Combinatorics (COCOON)*, 2008, 363–373.

- [24] Uli Wagner. *Minors in Random and Expanding Hypergraphs*. Proc. 27th Symp. Comput. Geom. (SoCG), 2011, 351–360.
- [25] Jiří Matoušek, Eric Sedgwick, Martin Tancer, and Uli Wagner. *Embeddability in the 3-sphere is decidable*. Proc. 30th Symp. Comput. Geom. (SoCG), 2014, 78–84.
- [26] Isaac Mabillard and Uli Wagner. *Eliminating Tverberg points, I. An analogue of the Whitney trick*. Proc. 30th Symp. Comput. Geom. (SoCG), 2014, 171–180.
- [27] Xavier Goaoc, Pavel Paták, Zuzana Patáková, Martin Tancer, and Uli Wagner. *Bounding Helly numbers via Betti numbers*. Proc. 31st Symp. Comput. Geom. (SoCG), 2015, 507–521.
- [28] Xavier Goaoc, Isaac Mabillard, Pavel Paták, Zuzana Patáková, Martin Tancer, and Uli Wagner. *On generalized Heawood inequalities for manifolds: a Van Kampen–Flores-type nonembeddability result*. Proc. 31st Symp. Comput. Geom. (SoCG), 2015, 476–490.
- [29] Isaac Mabillard and Uli Wagner. *Eliminating higher-multiplicity intersections, II. The deleted product criterion in the r -metastable range*. Proc. 32nd Symp. Comput. Geom. (SoCG), 2016, to appear.
- [30] Benjamin A. Burton, Arnaud de Mesmay, and Uli Wagner. *Finding non-orientable surfaces in 3-manifolds*. Proc. 32nd Symp. Comput. Geom. (SoCG), 2016, to appear.
- [31] Dominic Dotterer, Tali Kaufman, and Uli Wagner. *On expansion and topological overlap*. Proc. 32nd Symp. Comput. Geom. (SoCG), 2016, to appear.

Peer-Refereed Survey Articles

These are survey papers (as opposed to original research papers) that appeared in conference proceedings and special volumes with formal refereeing process.

- [32] Jørgen Bang-Jensen, Bruce Reed, Mathias Schacht, Robert Šámal, Bjarne Toft, and Uli Wagner. *On six problems posed by Jarik Nešetřil*. In: Topics in Discrete Mathematics (Martin Klazar, Jan Kratochvíl, Martin Loeb, Jiří Matoušek, Robin Thomas, eds.), Algorithms and Combinatorics 26, 2006, 613–627.
- [33] Uli Wagner. *k -Sets and k -facets*. In *Discrete and Computational Geometry – 20 Years Later* (Eli Goodman, János Pach, and Ricky Pollack, eds.), Contemporary Mathematics 453, American Mathematical Society, 2008, 443–514.

Theses

- Continuous Analogues of j -Facets and h -Vectors, Diplomarbeit, Freie Universität Berlin, 2000.
- On k -Sets and Their Applications, Ph.D. Thesis, Eidgenössische Technische Hochschule Zürich, 2003.