

General Information

Paul Joseph WOLLAN

Date of Birth: 21 September 1976

Place of Birth: Seattle, USA

Citizenship: United States of America

Languages: English (native), Italian (fluent), German (basic)

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Education

Georgia Institute of Technology, USA

Aug 2001 - Dec 2005

Ph.D. in Algorithms, Combinatorics, and Optimization

- Dissertation title: "Extremal Functions for Graph Linkages and Rooted Minors".
- Advisor: Prof. Robin Thomas.

University of Chicago, USA

Sept 1995 - June 1999

Bachelor of the Arts in Mathematics with Honors

Academic Appointments

Dec 2008 - current: **Sapienza University of Rome, Dip. Informatica**

Professore Associato

- Ricercatore from Dec 2008 - Oct 2013
- Confermato Feb 2012.
- Habilitation (*Abilitazione*) for full professor awarded Jan 2015.

Jan 2007 - Dec 2008: **University of Hamburg, Dept. of Math, Germany**

Humboldt Research Fellow

Jan 2006 - Jan 2007: **University of Waterloo, Dept. of C & O, Canada**

Postdoctoral Research Fellow

Aug 2001 - Dec 2005: **Georgia Institute of Technology, USA**

Grad Assistant and PhD Candidate

Sept 2000 - June 2001: **Los Alamos National Laboratory, USA**

Grad Research Assistant

Other Appointments - Visited Institutions

Technical University Berlin, Berlin, Germany

Visiting Professor

Sept 2015

Georgia Institute of Technology, Dept. of Mathematics, USA

Visiting Professor

Jan - June 2011, Jan - June 2012, Jan - June 2013, Jan-March 2014, July-August 2016

National Institute for Informatics, Tokyo, Japan

Visiting Professor

Aug - Sept 2009, Sept 2011, Nov 2014, Oct 2015

Columbia University , New York, USA July 2013	<i>Visiting Professor</i>
Hamburg University , Hamburg, Germany March - July 2009	<i>Visiting Researcher</i>
Princeton University , Princeton, USA Dec 2008, March 2010, Feb 2014	<i>Visitor</i>
INRIA-CNRS Mascote project-team , Sophia-Antipolis, France July 2008	<i>Visitor</i>

Teaching Experience - Courses Taught

University of Rome , Rome, Italy: <i>Instructor</i> Graph Theory - <i>Laurea Magistrale</i> . Lead Instructor, taught 6 times: 2010 - 2016. Progettazione di Algoritmi - <i>Laurea Triennale</i> . Lead Instructor, taught twice 2015 - 2016. Fondamenti di Programazione - <i>Laurea Triennale</i> . Laboratory Section, taught 4 times: 2010 - 2014.	2009 - present
University of Hamburg , Hamburg, Germany: <i>Instructor</i> Graph Minors - PhD course. Lead Instructor, taught once 2009.	2009
University of Waterloo , Waterloo, Canada: <i>Instructor</i> Linear Algebra - Undergraduate course. Instructor, taught once 2006.	2006
Georgia Institute of Technology , Atlanta, USA: <i>Lead Instructor</i> Combinatorics - Undergraduate course. Lead Instructor, taught twice 2004, 2011. Advanced Combinatorial Optimization - PhD course. Lead Instructor, taught twice 2012, 2013.	2004 - 2013

Teaching Experience - Supervised Students and Postdocs

<ul style="list-style-type: none"> • Katherine Edwards, 2015 - 2016 - PhD Princeton University 2016 - Currently Research Staff, Bell Labs 	<i>Graduate Researcher</i>
<ul style="list-style-type: none"> • Gregory Gauthier, 2015 - 2016 - PhD Princeton University 2016 	<i>Graduate Researcher</i>
<ul style="list-style-type: none"> • Spencer Backman, 2014 - 2015 - PhD Georgia Institute of Technology 2014 - Currently Postdoctoral researcher, University of Bonn 	<i>Postdoctoral Researcher</i>
<ul style="list-style-type: none"> • Ringi Kim, 2014 - 2015 	<i>Graduate Researcher</i>

- PhD Princeton University 2016
- Currently Postdoctoral researcher, University of Waterloo
- Tony Huynh, 2013 - 2015 *Postdoctoral Researcher*
 - PhD University of Waterloo 2009
 - Currently Postdoctoral researcher, University of Belgium
- Irene Muzi, current *PhD Student*
 - Anticipated Graduation 2017.
- Jan-Oliver Froehlich, 2014-2015 *Postdoctoral Researcher*
 - PhD University Hamburg 2013
- Matteo Pontecorvi, 2011 *Laurea Specialistica*
 - Currently PhD Candidate in the University of Austin Department of Computer Science
 - Thesis work published in *J. Combin. Theory Ser B*, entitled “Disjoint cycles intersecting a set of vertices.”

Awards and Honors

- 2013: Promoted to Associate Professor at Sapienza University through national program from the Ministry of Instruction and Research (*chiamata diretta*).
- 2012: Invited to present as representative of the faculty at the Inauguration of the Academic Year 2012 - 2013 at Sapienza University.
- 2006 - 2007: Humboldt Research Fellowship, awarded by the Alexander von Humboldt Foundation and hosted by the University of Hamburg.
- 2005: “Graduate Student of the Year” 2004-2005, Department of Mathematics, Georgia Institute of Technology.
- 2004: NSF VIGRE research fellowship, Department of Mathematics, Georgia Institute of Technology
- 2000: Presidential Fellow, Georgia Institute of Technology, 2000 - 2005.

Invited Plenary Presentations

1. Structure in Graphs and Matroids, University of Waterloo, July 2017.
2. *When Are Directed Graphs Well-quasi-ordered*, Colloquia in Combinatoric, London School of Economics, May 2014.
3. *A New Proof for the Weak-Structure Theorem with Explicit Bounds*, Dagstuhl Seminar “Bidimensional Structures: Algorithms, Combinatorics and Logic”, Germany, March 2013.
4. *Explicit Bounds for the Weak-Structure Theorem*, Workshop on Graphs and Matroids, Maastricht, Netherlands, August 2012.
5. *Excluding a Clique Immersion*, Graph Theory at Georgia Tech, Atlanta, May 2012.
6. *New Proofs in Graph Minors*, Mathematical Foundations of Computer Science (MFCS), Warsaw, Poland, August 2011.
7. *A Shorter Proof of the Unique Linkage Theorem*, Oberwolfach Workshop, Oberwolfach, Germany, March

2010.

Other Invited Presentations

1. *Forcing clique immersions through chromatic number*, BIRS Workshop on Graph Coloring, Banff Canada, October 2016.
2. *Packing cycles in doubly group labeled graphs*, SIAM Discrete Mathematics, Atlanta USA, July 2016.
3. *Explicit bounds for the graph minor structure theorem*, Oberwolfach Graph Theory, Oberwolfach, Germany January 2016.
4. *When Are Directed Graphs Well-quasi-ordered*, ICM Satellite Conference on Extremal and Structural Graph Theory, Gyongju Korea, August 2014.
5. *Packing Disjoint A-paths With Specified Ends*, SIAM Discrete Mathematics, Minneapolis USA, July 2014.
6. *Packing A-paths With Specified Endpoints*, Bellairs Workshop on Graph Theory, Holetown, Barbados, March 2014.
7. *Immersions in Highly Connected Graphs*, Oberwolfach Workshop, Oberwolfach, Germany, March 2013.
8. *A Short Proof of the Unique Linkage Theorem*, Atlanta Lecture Series in Combinatorics and Discrete Math, Atlanta, April 2011.
9. *A Shorter Proof of the Unique Linkage Theorem*, SIAM Conference on Discrete Mathematics, Austin, June 2010.
10. *Linking Vortices*, Workshop on Graph Theory, Princeton, May 2009.
11. *Non-zero Cycles in Group Labeled Graphs*, Banf Workshop, Banf, Canada, September 2008.
12. *Packing Disjoint Clique Minors*, Sittard, Netherlands, July 2008.
13. *Complete Minors in Large Six Connected Graphs*, Graph Theory 2007, Fredericia, Denmark, December 2007.
14. *Progress on Removable Paths Conjectures*, Oberwolfach Workshop, Oberwolfach, Germany, March 2007.
15. *K_6 Minors in Large Six Connected Graphs*, SIAM Conference on Discrete Mathematics, Victoria, Canada, June 2006.
16. *Extremal Functions for Linkages and Rooted Minors*, ACCOTA, Combinatorial and Computational Aspects of Optimization, Topology, and Algebra, Guanajuato, Mexico, October 2004.
17. *The Extremal Function for 3-linked Graphs*, SIAM Conference on Discrete Mathematics, Nashville, June 2004.

Professional Activities

- Associate Editor: Discrete Mathematics, 2016 - current.
- Scientific Committee member: SIAM Conference on Discrete Mathematics 2016, Graph Theory at Georgia Tech 2013.

- Program Committee member: SIAM Symposium on Discrete Algorithms (SODA) 2014, Workshop on Approximation and Online Algorithms (WAOA) 2012, 2015, European Symposium on Algorithms (ESA) 2016.
- Reviewer for national scientific funding agencies: National Science Foundation and National Security Agency (USA), 2008, 2010 - 2013, the Australian Research Council 2011 - 2013, the National Science and Engineering Research Council of Canada 2011, 2014, FONDECYT of Chile, 2011, Czech Science Foundation 2014, and Ministero dell' Istruzione, dell' Università e della Ricerca 2015.
- Chaired of invited session “Structural Graph Theory and Methods,” at the International Symposium on Math Programming (ISMP) in Berlin in Aug 2012. Chair of the invited session “Graph Structure” at the SIAM Conference on Discrete Math held in Minneapolis in June 2014.
- Organizer of 6 international conferences and workshops: Graph Theory at Georgia Tech in Atlanta, USA 2012, the Bertinoro Workshop on Algorithms and Graphs in 2009, 2011, and 2013, the Southern Italian Workshop on Algorithms and Graphs 2016, and the CIRM Workshop on Graph Theory 2015.

Funding Information

- 2011 - 2017: ERC DASTCO - *European Research Council Starter Grant* **850,000 €**
Principal Investigator of the ERC project DASTCO, a 5 year project to study structural aspects of signed and directed graphs. Budget includes funding for 2 graduate students and six 1-year post doctoral positions. Awarded by the European Union Research Council.
- 2007 - 2008: *Humboldt Foundation Research Fellowship*: **69,000 €**
Recipient of a Humboldt Research Fellowship hosted by Prof. Reinhard Diestel at the University of Hamburg. Originally funded for one year, awarded the maximum extension of 1 year in 2008.
- 2012 - 2013: *ATENEO Grant*: **25,500 €**
Principal Investigator for a project on problems in graph theory and aspects of proof complexity. Funded by the internal funding agency of the University of Rome La Sapienza.
- 2017 - 2017: *ATENEO Grant*: **8000 €**
Principal Investigator for a project on applications of graph theory in theoretical computer science. Funded by the internal funding agency of the University of Rome La Sapienza.

Most Significant Publications

1. P. Wollan, “The structure of graphs not admitting a fixed immersion.” *J. Combin. Theory, Ser. B.* **110** (2015) 47 – 66.
- citations: 6 - 88th percentile Field weighted citation impact: 5.24 (scopus)
- Journal Impact Factor: 1.3
- Summary: the article develops a structure theory for graph immersions analogous to the graph minor structure theory of Robertson and Seymour, including a general structure theorem and a new width parameter with corresponding grid theorem. The work has seen numerous algorithmic applications, including new FPT algorithms for problems not efficiently solvable on graphs of bounded tree-width.
2. H. Bruhn, R. Diestel, M. Kriesell, R. Pevindigh, and P. Wollan, “Axioms for Infinite Matroids.” *Advances in Mathematics.* **239** (2013) 18 – 46.
- citations: 12 - 91st percentile Field weighted citation impact: 4.19 (scopus)

- jecture.” *J. Combin. Theory, Ser. B* **98**, (2008) 972 – 979.
8. P. Wollan, “Extremal Functions for Rooted Minors.” *J. Graph Theory* **58** vol. 2, (2008) 159 – 178.
 9. P. Wollan, “Packing Non-zero A-paths in an Undirected Model of Group Labeled Graphs.” *J. Combin. Theory, Ser. B* **100**, (2010) 141 – 150.
 10. D. Berg, S. Norine, F. E. Su, R. Thomas, and P. Wollan, “Voting in Agreeable Societies.” *AMS Math. Monthly* **117**, (2010) 27 – 39.
 11. P. Wollan, “Bridges in Highly Connected Graphs.” *SIAM J. Disc. Math.* **24**, (2010) 1731 – 1741.
 12. P. Wollan, “Packing Cycles with Modularity Constraints.” *Combinatorica* **31**, (2011) 95 – 126.
 13. R. Diestel, K. Kawarabayashi, and P. Wollan, “The Erdős-Pósa Property for Clique Minors in Highly Connected Graphs.” *J. Combin. Theory, Ser. B* **102**, (2012) 454 – 469.
 14. H. Bruhn and P. Wollan, “Finite Connectivity in Infinite Matroids.” *European J. of Combinatorics* **33** (2012) 1900 – 1912.
 15. M. Pontecorvi and P. Wollan, “Disjoint Cycles Intersecting a Set of Vertices.” *J. Combin. Theory, Ser. B* **102** (2012) 1134 – 1141.
 16. R. Diestel, K. Kawarabayashi, T. Müller, and P. Wollan, “On the Excluded Minor Structure Theorem for Graphs of Large Tree-width.” *J. Combin. Theory, Ser. B* **102** (2012) 1189 – 1210.
 17. B. Guenin, I. Pivotto, and P. Wollan, “Relations Between Pairs of Representations of Signed Binary Matroids.” *SIAM J. Disc. Math.* **27** (2013) 329 – 341.
 18. H. Bruhn, R. Diestel, M. Kriesell, R. Pevindigh, and P. Wollan, “Axioms for Infinite Matroids.” *Advances in Mathematics* **239** (2013) 18 – 46.
 19. D. Marx and P. Wollan, “Immersion in highly connected graphs” *SIAM J. of Disc. Math.* **28**(1) (2014) 503 – 520.
 20. P. Wollan, “The structure of graphs not admitting a fixed immersion.” *J. Combin. Theory, Ser. B.* **110** (2015) 47 – 66.
 21. B. Guenin, I. Pivotto, and P. Wollan, “Displaying Blocking Pairs in Signed Graphs.” *Europ. J. Combin.* **51** (2016) 135 – 164.
 22. B. Guenin, I. Pivotto, and P. Wollan, “Stabilizer Theorems for Even Cycle Matroids.” *J. Combin. Theory, Ser B.* (2016).
 23. Z. Dvorak and P. Wollan, “A structure theorem for strong immersions.” *J. Graph Theory.* (2016).
 24. D. Marx, P. Seymour, and P. Wollan, “Rooted grid minors.” to appear: *J. Combin. Theory, Ser B.*

REFEREED CONFERENCE PROCEEDINGS:

25. K. Kawarabayashi and P. Wollan, “A Shorter Proof of the Graph Minors Algorithm - The Unique Linkage Theorem.” *Proceedings of the AMS Symposium on the Theory of Computing (STOC) 2010*, 687 – 694.
26. K. Kawarabayashi, B. Reed, and P. Wollan, “The Graph Minor Algorithm with Parity Conditions.” *Proceedings of the IEEE Symposium on Foundations of Computer Science (FOCS) 2011*, 27 – 36.

27. K. Kawarabayashi and P. Wollan, “A Simpler Algorithm and Shorter Proof for the Graph Minors Decomposition.” *Proceedings of the ACM Symposium on Theory of Computing (STOC) 2011*, 451 – 458.
28. M. Grohe, K. Kawarabayashi, D. Marx, and P. Wollan, “Finding Topological Subgraphs is Fixed Parameter Tractable.” *Proceedings of the ACM Symposium on Theory of Computing (STOC) 2011*, 479 – 484.
29. D. Marx, and P. Wollan, “An Exact Characterization of Tractable Demand Patterns for Maximum Disjoint Path Problems.” *Proceedings of the ACM/SIAM Symposium on Discrete Algorithms (SODA) 2015*, 642 – 661.

SUBMITTED ARTICLES:

30. K. Kawarabayashi, S. Norine, R. Thomas and P. Wollan, “ K_6 Minors in 6-connected Graphs of Bounded Treewidth.” to appear: *J. Combin. Theory, Ser. B*.
31. K. Kawarabayashi, S. Norine, R. Thomas, and P. Wollan, “ K_6 Minors in Large 6-connected Graphs.” to appear: *J. Combin. Theory, Ser. B*.
32. K. Kawarabayashi, R. Thomas, and P. Wollan, “A new proof of the flat wall theorem.” to appear: *J. Combin. Theory, Ser B*.
33. P. Bennett, I. Bonacina, N. Galesi, T. Huynh, M. Molloy, and P. Wollan, “Space proof complexity for random 3-CNFs.” submitted to: *Information and Computing*.
34. S. A. Amiri, K. Kawarabayashi, S. Kreutzer, and P. Wollan, “The Erdős-Pósa property for directed graphs.”
35. F. Joos, T. Huynh, and P. Wollan, “A unified Erdős-Pósa theorem for labeled graphs.” submitted to: *Combinatorica*.
36. K. Edwards, I. Muzi, P. Wollan, “The half-integral disjoint paths problem in highly connected directed graphs.” submitted to: *STOC 2017*.

Summary of citation record

Values taken from Scopus database.

<u>Parameter</u>	<u>Database</u>	<u>Value</u>
Total impact factor*	researchgate	32.86
Total citations	scopus	257
Average citations per product	scopus	8.86
H-index	scopus	9

* Total impact factor calculated as the sum of impact factor in the year of publication of all journal publications. When the impact factor for a given year is unavailable, the 5-year impact factor is used.

updated November 2016.