

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)*Permanent Address and contact:*Via Caltagirone 15
00182 Roma Italia*Tel:* +39 347-773-8834*E-mail:* wollan@di.uniroma1.it**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 Ordinario*

- Ricercatore from Dec 2008 - Oct 2013, Professore Associato from Oct 2013 - Jan 2018
- Confermato Feb 2012.

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***Teaching Experience - Courses Taught****University of Rome, Rome, Italy:**

2009 - present

*Instructor*Graph Theory - *Laurea Magistrale*. Lead Instructor, taught 9 times: 2010 - 2022.Progettazione di Algoritmi - *Laurea Triennale*. Lead Instructor, taught 7 times 2015 - 2022.Fondamenti di Programazione - *Laurea Triennale*. Laboratory Section, taught 4 times: 2010 - 2014.**University of Hamburg, Hamburg, Germany:**

2009

Instructor

Graph Minors - PhD course. Lead Instructor, taught once 2009.

University of Waterloo, Waterloo, Canada:

2006

Instructor

Linear Algebra - Undergraduate course. Instructor, taught once 2006.

Georgia Institute of Technology, Atlanta, USA:

2004 - 2013

Lead Instructor

Combinatorics - Undergraduate course. Lead Instructor, taught twice 2004, 2011.

Advanced Combinatorial Optimization - PhD course. Lead Instructor, taught twice 2012, 2013.

Teaching Experience - Supervised Students and Postdocs

- Katherine Edwards, 2015 - 2016 *Graduate Researcher*
 - PhD Princeton University 2016
 - Currently, Senior Engineer at Google.
- Gregory Gauthier, 2015 - 2016 *Graduate Researcher*
 - PhD Princeton University 2017.
 - Currently, Software Engineer at Salesforce.
- Spencer Backman, 2014 - 2015 *Postdoctoral Researcher*
 - PhD Georgia Institute of Technology 2014
 - Currently Assistant Professor at the University of Vermont.
- Ringi Kim, 2014 - 2015 *Graduate Researcher*
 - PhD Princeton University 2016
 - Currently, Assistant Professor at Inha University.
- Jan-Oliver Froehlich, 2014-2015 *Postdoctoral Researcher*
 - PhD University Hamburg 2013
- Tony Huynh, 2013 - 2015 *Postdoctoral Researcher*
 - PhD University of Waterloo 2009
 - Currently Assistant Professor at Sapienza University of Rome.
- Irene Muzi, 2012 - 2017 *PhD*
 - PhD University of Rome 2017
 - Currently Lecturer at Birkbeck University of London.
- Tommaso d'Orsi, 2017 *Laurea Specialistica*
 - PhD candidate, ETH Zurich
- Giacomo Paesani, 2016 *Laurea Specialistica*
 - PhD candidate, University of Durham
- Matteo Pontecorvi, 2011 *Laurea Specialistica*
 - PhD 2018 at 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."

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.

2016 - 2018: *ATENEO Grant:* **33,000 €**

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.

2019-2020: *ATENEO Grant:* **24,000 €**

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.

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.

Invited Plenary Presentations

1. *Explicit bounds for graph minors*, British Combinatorial Conference (BCC 2022), Lancaster, Great Britain, July 2022.
2. *Explicit bounds for graph minors*, 8th Czech-Slovak Int. Symp. on Graph Theory, Combinatorics, Algorithms and Applications, Prague, July 2022.
3. *Explicit bounds for graph minors*, Workshop on Graph Theory and Combinatorics, Atlanta USA, August 2022.
4. *Towards a structure theory for vertex minors*, Graphs, Networks, and their Applications, Moscow Institute of Physics and Technology, May 2019.
5. A "Grid" Theorem for Vertex Minors and Rankwidth, One Day Meeting in Combinatorics - Oxford University, May 2018.
6. *A New Look at the Structure of Graphs Excluding a Fixed Minor*, European Conference on Combinatorics, Graph Theory, and Applications - EUROCOMB 2017, Vienna, August 2017.
7. *A Shorter Proof for the Graph Minor Structure Theorem with Explicit Bounds*, Structure in Graphs and

Matroids, University of Waterloo, July 2017.

8. *When Are Directed Graphs Well-quasi-ordered*, Colloquia in Combinatoric, London School of Economics, May 2014.
9. *A New Proof for the Weak-Structure Theorem with Explicit Bounds*, Dagstuhl Seminar “Bidimensional Structures: Algorithms, Combinatorics and Logic”, Germany, March 2013.
10. *Explicit Bounds for the Weak-Structure Theorem*, Workshop on Graphs and Matroids, Maastricht, Netherlands, August 2012.
11. *Excluding a Clique Immersion*, Graph Theory at Georgia Tech, Atlanta, May 2012.
12. *New Proofs in Graph Minors*, Mathematical Foundations of Computer Science (MFCS), Warsaw, Poland, August 2011.
13. *A Shorter Proof of the Unique Linkage Theorem*, Oberwolfach Workshop, Oberwolfach, Germany, March 2010.

Other Invited Presentations

1. *Coloring graphs with no clique immersion*, SIAM Discrete Math, Denver USA, June 2018.
2. *Explicit bounds for the graph minor structure theorem*, ACO 25, Atlanta USA, January 2017.
3. *Forcing clique immersions through chromatic number*, BIRS Workshop on Graph Coloring, Banff Canada, October 2016.
4. *Packing cycles in doubly group labeled graphs*, SIAM Discrete Mathematics, Atlanta USA, July 2016.
5. *Explicit bounds for the graph minor structure theorem*, Oberwolfach Graph Theory, Oberwolfach, Germany January 2016.
6. *When Are Directed Graphs Well-quasi-ordered*, ICM Satellite Conference on Extremal and Structural Graph Theory, Gyongju Korea, August 2014.
7. *Packing Disjoint A-paths With Specified Ends*, SIAM Discrete Mathematics, Minneapolis USA, July 2014.
8. *Packing A-paths With Specified Endpoints*, Bellairs Workshop on Graph Theory, Holetown, Barbados, March 2014.
9. *Immersion in Highly Connected Graphs*, Oberwolfach Workshop, Oberwolfach, Germany, March 2013.
10. *A Short Proof of the Unique Linkage Theorem*, Atlanta Lecture Series in Combinatorics and Discrete Math, Atlanta, April 2011.
11. *A Shorter Proof of the Unique Linkage Theorem*, SIAM Conference on Discrete Mathematics, Austin, June 2010.
12. *Linking Vortices*, Workshop on Graph Theory, Princeton, May 2009.
13. *Non-zero Cycles in Group Labeled Graphs*, Banf Workshop, Banf, Canada, September 2008.
14. *Packing Disjoint Clique Minors*, Sittard, Netherlands, July 2008.
15. *Complete Minors in Large Six Connected Graphs*, Graph Theory 2007, Fredericia, Denmark, December 2007.

16. *Progress on Removable Paths Conjectures*, Oberwolfach Workshop, Oberwolfach, Germany, March 2007.
17. *K_6 Minors in Large Six Connected Graphs*, SIAM Conference on Discrete Mathematics, Victoria, Canada, June 2006.
18. *Extremal Functions for Linkages and Rooted Minors*, ACCOTA, Combinatorial and Computational Aspects of Optimization, Topology, and Algebra, Guanajuato, Mexico, October 2004.
19. *The Extremal Function for 3-linked Graphs*, SIAM Conference on Discrete Mathematics, Nashville, June 2004.

Professional Activities

- Associate Editor: Discrete Mathematics, 2016 - 2020.
- 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, 2018, 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 and at the SIAM Conference on Discrete Math held in Denver in June 2018.
- 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.

Full List of Publications

JOURNAL:

1. R. Thomas and P. Wollan, "An Improved Linear Edge Bound for Graph Linkages." *European J. of Combinatorics* **26**, (2005) 309 – 324.
2. G. Brinkmann, S. Greenberg, C. Greenhill, B. McKay, R. Thomas, and P. Wollan, "Generation of Simple Quadrangulations of the Sphere." *Discrete Math.* **305**, (2005) 33 – 54.
3. K. Kawarabayashi and P. Wollan, "Non-zero Disjoint cycles in Highly Connected Group Labeled Graphs." *J. Combin. Theory, Ser. B* **96**, (2006) 296 – 301.
4. S. Norine, P. Seymour, R. Thomas, and P. Wollan, "Proper Minor-Closed Families are Small." *J. Combin. Theory, Ser. B* **96**, (2006) 754 – 757.
5. P. Wollan, "Extremal Functions for Shortening Sets of Paths." *Combinatorics, Probability, and Comput-*

- ing **15**, (2006) 927 – 932.
6. R. Thomas and P. Wollan, “The Extremal Function for 3-linked Graphs.” *J. Combin. Theory, Ser. B* **98**, (2008) 939 – 971.
 7. K. Kawarabayashi, O. Lee, B. Reed, and P. Wollan, “A Weaker Version of Lovász’ Path Removal Conjecture.” *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.* **118** (2016) 44 – 75.
 23. Z. Dvorak and P. Wollan, “A structure theorem for strong immersions.” *J. Graph Theory.* **83**(2) (2016) 152 – 163.
 24. D. Marx, P. Seymour, and P. Wollan, “Rooted grid minors.” *J. Combin. Theory, Ser. B.* **122**(1) (2017) 428 – 437.
 25. P. Bennett, I. Bonacina, N. Galesi, T. Huynh, M. Molloy, and P. Wollan, “Space proof complexity for random 3-CNFs.” *Information and Computing* **255** (2017) 165 – 176.

26. K. Kawarabayashi, S. Norine, R. Thomas, and P. Wollan, “ K_6 Minors in Large 6-connected Graphs.” *J. Combin. Theory, Ser. B.* **129** (2018) 158 - 203.
27. K. Kawarabayashi, R. Thomas, and P. Wollan, “A new proof of the flat wall theorem.” to appear: *J. Combin. Theory, Ser. B.* **129** (2018) 204 - 238.
28. F. Joos, T. Huynh, and P. Wollan, “A unified Erdős-Pósa theorem for labeled graphs.” *Combinatorica* **39(1)** (2019) 91 - 133.
29. K. Kawarabayashi, S. Norine, R. Thomas and P. Wollan, “ K_6 Minors in 6-connected Graphs of Bounded Treewidth.” *J. Combin. Theory, Ser. B.* **136** (2019) 1 - 32.
30. G. Gauthier, T.-N. Le, and P. Wollan, “Forcing clique immersions through chromatic number” *Europ. J. Combinatorics* **81** (2019) 98 - 118.
31. P. Wollan and D. Wood, “Nonrepetitive colorings of graphs excluding a fixed immersion or topological minor” *J. Graph Theory* **91(3)** (2019) 259 - 266.
32. H. Choi, O.-J. Kwon, S.-I. Oum, and P. Wollan, “Chi-boundedness of graph classes excluding wheel vertex minors” *J. Combin. Theory, Ser. B.* **135** (2019) 319 - 348.
33. O.-J. Kwon, R. McCarty, S.-I. Oum, and P. Wollan, “Obstructions for bounded shrub-depth and rank-depth” *J. Combin. Theory, Ser. B.* **149** (2021) 76 - 91.
34. T. Huynh, G. Joret, P. Micek, M. Seweryn, and P. Wollan, “Excluding a ladder” *Combinatorica* **42** (2022) 405 - 432.
35. J. Geelen, O.-J. Kwon, R. McCarty, and P. Wollan, “The Grid Theorem for vertex minors” *J. Combin. Theory, Ser. B.* **158** (2023) 93 - 116.

REFEREED CONFERENCE PROCEEDINGS:

36. 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.
37. 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.
38. 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.
39. 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.
40. 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.
41. K. Edwards, I. Muzi, P. Wollan, “The half-integral disjoint paths problem in highly connected directed graphs.” *Proceedings of the 2017 European Symposium on Algorithms (ESA)*.

Summary of citation record

Values taken from Scopus database.

<u>Parameter</u>	<u>Database</u>	<u>Value</u>
Total citations	scopus	696
H-index	scopus	13