Curriculum Vitae

Personal Data

Full name: Penelope Evelyn Haxell

Address: Department of Combinatorics and Optimization, University of Waterloo, Waterloo Ont. Canada N2L 3G1

Education:

1984–1988 University of Waterloo, BMath Honours
Oct. 1988–June 1989 University of Cambridge,
Certificate of Advanced Study in Mathematics (with Distinction)
Oct. 1989–Mar. 1993 University of Cambridge, PhD in Combinatorics
Thesis title: Extremal and Ramsey type results in graphs and hypergraphs
PhD Supervisor: B. Bollobás

Recognitions:

1993–1998 NSERC Women's Award
2001–2006 Ontario Premier's Research Excellence Award
2006 Krieger–Nelson Prize of the Canadian Mathematical Society
2010 Top-cited Paper Award, J. Combinatorial Theory A
2011–2015 Friedrich Wilhelm Bessel Award of the Humboldt Foundation
2014 Mathematics Faculty Award for Distinction in Teaching
2014 Outstanding Performance Award, University of Waterloo
2018 Mercator Fellowship, Freie Universität Berlin
2020–2027 University Research Chair, University of Waterloo

Research interests: Combinatorics and graph theory

Employment:

at Department of Combinatorics and Optimization, University of Waterloo:
July 1993–June 1998, Assistant Professor
July 1998–June 2004, Associate Professor (tenured)
from July 2004, Full Professor

at Bell Laboratories, Lucent Technologies, Murray Hill NJ:
January 2002–December 2002, Visiting Professor

Research and Scholarship

Research Grants:

NSERC operating grant $15000 p.a., 1993–1996
NSERC operating grant $16000 p.a., 1997–2000
NSERC operating grant $21000 p.a., 2001–2004
PREA award $30000 p.a., 2001–2006
NSERC operating grant $21000 p.a., 2005–2010
OCE Industrial Partnership grant, $67500 p.a. (personal portion), 2009–2010
NSERC Discovery Grant (individual), $20000 p.a. 2011–2016
NSERC CRD, $36000 p.a. (personal portion), 2012–2014
NSERC Discovery Grant (individual), $24000 p.a. 2017-2022

Publications in refereed journals:

1. P.E. Haxell, J.J. McDonald, S.K. Thomason, Counting interval orders, *Order* 4 (1987), pp. 269-272
2. P.E. Haxell, A note on a conjecture of Ryser, *Periodica Mathematica Hungarica* 30 (1995), pp. 73-79
3. P.E. Haxell, A note on a conjecture of Gallai, *Graphs and Combinatorics* 11 (1995), pp. 53-57
4. P.E. Haxell, Y. Kohayakawa, T. Łuczak, The induced size-Ramsey number of cycles, *Combinatorics, Probability and Computing* 4 (1995), pp. 217-239
5. P.E. Haxell, A condition for matchability in hypergraphs, *Graphs and Combinatorics* 11 (1995), pp. 245-248
6. P.E. Haxell, Y. Kohayakawa, An anti-Ramsey property of Ramanujan graphs, *Random Structures and Algorithms* 6 (1995), pp. 417-431
7. P.E. Haxell, Y. Kohayakawa, T. Łuczak, Turán's extremal problem in random graphs: forbidding even cycles, *Journal of Combinatorial Theory B* 64 (1995), pp. 273-287
8. P.E. Haxell, Y. Kohayakawa, The size-Ramsey number of trees, *Israel Journal of Mathematics* 89 (1995), pp. 261-274
9. P.E. Haxell, Y. Kohayakawa, T. Łuczak, Turán's extremal problem in random graphs: forbidding odd cycles, *Combinatorica* 16 (1996), pp. 107-122
10. P.E. Haxell, Y. Kohayakawa, Partitioning by monochromatic trees, *Journal of Combinatorial Theory B* 68 (1996), pp. 218-222
11. B. Yu, J. Cheriyan, P.E. Haxell, Hypercubes and multicommodity flows, *SIAM Journal of Discrete Mathematics* 10 (1997), pp. 190–200
12. P.E. Haxell, Atoms of set systems with a fixed number of pairwise unions, *Discrete Mathematics* 150 (1996), pp. 155-166
13. P.E. Haxell, Partitioning complete bipartite graphs by monochromatic cycles, *Journal of Combinatorial Theory B* 69 (1997), pp. 210-218
14. P.E. Haxell, Y. Kohayakawa, Packing and covering triangles in tripartite graphs, *Graphs and Combinatorics* 14 (1998), pp. 1–10

15. P.E. Haxell, Packing and covering triangles in graphs, *Discrete Mathematics* 195 (1999), pp. 251–254 (This paper was also selected for inclusion in the special volume *Discrete Mathematics, Editors' Choice, Edition 1999*)
16. P.E. Haxell, T. Łuczak, Embedding trees into graphs of large girth, *Discrete Mathematics* 216 (2000), pp. 273–278
17. R. Aharoni, P.E. Haxell, Hall's Theorem for hypergraphs, *Journal of Graph Theory* 35 (2000), pp. 83–88
18. Haxell, P.E., Tree embeddings, *Journal of Graph Theory* 36 (2001), 121–130
19. Haxell, P.E., Rödl, V., Integer and fractional packings in dense graphs, *Combinatorica* 21 (2001), 13–38
20. Haxell, P.E., A note on vertex list-colouring, *Combinatorics, Probability and Computing* 10 (2001), 345–347
21. Haxell, P.E., Łuczak, T., Tingley, P.W., Ramsey numbers for trees of small maximum degree, *Combinatorica* 22 (2002), 287–320
22. Gould, R.J., Haxell, P.E., Scott, A.D., A note on cycle lengths in graphs, *Graphs and Combinatorics* 18 (2002), 491–498
23. Dementieva, Y., Haxell, P.E., Nagle, B., Rödl, V., On characterizing hypergraph regularity, *Random Structures and Algorithms* 21 (2002), 293–335
24. Haxell, P.E., Nagle, B., Rödl, V., Integer and fractional packings in dense 3-uniform hypergraphs, *Random Structures and Algorithms* 22 (2003), 248–310
25. Haxell, P.E., Szabó, T., Tardos, G., Bounded size components – partitions and transversals, *Journal of Combinatorial Theory B* 88 (2003), 281–297
26. Haxell, P.E., On the strong chromatic number, *Combinatorics, Probability and Computing* 13 (2004), 857–865
27. Donadelli, J., Haxell, P.E., Kohayakawa, Y., A note on the size-Ramsey number of long subdivisions of graphs, *Theoretical Informatics and Applications* 39 (2005), 191–206
28. Haxell, P., Łuczak, T., Peng, Y., Rödl, V., Ruciński, A., Simonovits, M., Skokan, J., The Ramsey number for hypergraph cycles I, *Journal of Combinatorial Theory A* 113 (2006), 67–83
29. Haxell, P.E., Szabó, T., Odd independent transversals are odd, *Combinatorics, Probability and Computing* 15 (2006), pp. 193–211
30. Haxell, P.E., Seamone, B.D., Verstraete, J.B.A., Independent dominating sets and Hamiltonian cycles, *Journal of Graph Theory* 54 (2007), 233–244
31. Hamburger, P., Haxell, P., Kostochka, A., On directed triangles in digraphs, *Electronic Journal of Combinatorics* 14 (2007) Note 19 (9p)
32. Haxell, P.E., Nagle, B., Rödl, V., An algorithmic version of the hypergraph regularity method, *SIAM Journal on Computing* 37 (2008), 1728–1776
33. Haxell, P.E., An improved bound on the strong chromatic number, *Journal of Graph Theory* 58 (2008), 148–158

34. Haxell, P.E., Pikhurko, O., Thomason, A.G., Maximum acyclic and fragmented sets in regular graphs, *Journal of Graph Theory* 57 (2008), 149–156
35. Haxell, P., Łuczak, T., Peng, Y., Rödl, V., Ruciński, A. and Skokan, J., The Ramsey number for 3-uniform tight hypergraph cycles, *Combinatorics, Probability and Computing* 18 (2009), 165–203
36. Haxell, P., Pei, M., On list colouring Steiner triple systems, *Journal of Combinatorial Designs* 17 (2009), 314–322
37. Gyárfás, A., Haxell, P., Large monochromatic components in colorings of complete 3-uniform hypergraphs, *Discrete Mathematics* 309 (2009), 3156–3160
38. Cui, Q., Haxell, P., Ma, W., Packing and covering triangles in planar graphs, *Graphs and Combinatorics* 25 (2009), 817–824
39. Haxell, P.E., Verstraete, J.B.A., List coloring hypergraphs, *Electronic J. Combin.* 17 (2010), R129 (12p)
40. Haxell, P., Wilfong, G.T., On the stable paths problem, *SIAM J. Discrete Math.* 24 (2010), 1137–1152
41. Haxell, P.E., On forming committees, *American Math. Monthly* 118 (2011), 777–788
42. Haxell, P.E., Pikhurko, O., Taraz, A., Primality of trees, *J. Comb.* 2 (2011), 481–500
43. Barrera-Cruz, F., Haxell, P., A Note on Schnyder's Theorem, *Order* 28 (2011), 221–226
44. Haxell, P.E., McDonald, J.M., On characterizing Vizing's edge colouring bound, *J. Graph Theory* 69 (2012), 160–168
45. Haxell, P.E., Kostochka, A., Thomassé, S., A stability theorem for fractional covering of triangles by edges, *European J. Combinatorics* 33 (2012), 799–806
46. Haxell, P.E., Kostochka, A., Thomassé, S., Packing and covering triangles in K_4-free planar graphs, *Graphs and Combinatorics* 28 (2012), 653–662
47. Haxell, P.E., Scott, A.D., On Ryser's Conjecture, *Elec. J. Comb.* 19 (2012), paper 23 (10pp.)
48. Dellamonica, D. Jr., Haxell, P.E., Łuczak, T., Mubayi, D., Nagle, B., Person, Y., Rödl, V., Schacht, M., Tree-minimal graphs are almost regular, *J. Comb.* 3 (2012), 49–62
49. Dellamonica, D. Jr., Haxell, P.E., Łuczak, T., Mubayi, D., Nagle, B., Person, Y., Rödl, V., Schacht, M., Verstraëte, J., On even-degree subgraphs of linear hypergraphs, *Comb. Prob. Comput.* 21 (2012), 113–127
50. Berke, R., Haxell, P.E., Szabó, T., Bounded transversals in multipartite graphs, *J. Graph Th.* 70 (2012), 318–331
51. Haxell, P., Ghosh, S.K., Packing and covering tetrahedra, *Discrete Applied Math.* 161 (2013), 1209–1215
52. Haxell, P., Kierstead, H., Edge colouring multigraphs without small dense subsets, *Discrete Math.* 338 (2015), 2502–2506

53. Alamdari, S., Angelini, P., Barrera-Cruz, F., Chan, T., Da Lozzo, G., Di Battista, G., Frati, F., Haxell, P., Lubiw, A., Patrignani, M., Roselli, V., Singla, S., Wilkinson, B., How to morph planar graph drawings, *SIAM J. Computing* 46 (2017), 824–852
54. Haxell, P., Scott, A., On lower bounds for the matching number of subcubic graphs, *J. Graph Th.* 85 (2017), 336–348
55. Haxell, P., Scott, A., A note on intersecting hypergraphs with large cover number, *Electronic J. Comb.* 24 (2017), paper P3.26
56. Haxell, P.E., Narins, L., Szabó, T., Extremal hypergraphs for Ryser's Conjecture, *Journal of Combinatorial Theory A* 158 (2018), 492–547
57. Haxell, P.E., Narins, L., A stability theorem for matchings in tripartite 3-graphs, *Comb. Prob. Comput.* 27 (2018), 774–793
58. Aharoni, A., Alon, N., Amir, M., Haxell, P.E., Hefetz, D., Jiang, Z., Kronenberg, G., Naor, A., Ramsey-nice families of graphs, *European J. Combinatorics* 72 (2018), 29–44
59. Haxell, P.E., Krivelevich, M., Kronenberg, G., Goldberg's conjecture is true for random multigraphs. *J. Combin. Theory Ser. B* 138 (2019), 314–349.
60. Barrera-Cruz, F., Haxell, P.E., Lubiw, A., Morphing Schnyder drawings of planar triangulations. *Discrete Comput. Geom.* 61 (2019), no. 1, 161–184.
61. A. Graf, P.E. Haxell, Finding independent transversals efficiently, *Combin. Probab. Comput.* 29 (2020), no. 5, 780–806.
62. A. Graf, D.G. Harris, P. Haxell, Algorithms for weighted independent transversals and strong colouring, *ACM Transactions on Algorithms*, to appear

Publications in refereed conference proceedings:

1. Haxell, P., Rasala, A., Wilfong, G.T., Winkler, P.M., Wide-sense non-blocking WDM cross-connects, *European Symposium on Algorithms* (2002), 538–549
2. Haxell, P.E., Nagle, B., Rödl, V., An algorithmic version of the hypergraph regularity method, *Foundations of Computer Science* (2005), 439–446
3. Haxell, P.E., Wilfong, G.T., A fractional model of the Border Gateway Protocol, *Symposium on Discrete Algorithms* (2008), 193–199
4. Barrera-Cruz, F., Haxell, P.E., Lubiw, A., Morphing planar graph drawings with unidirectional moves, *Mexican Conference on Discrete Mathematics and Computational Geometry* (2013), 57–65
5. Barrera-Cruz, F., Haxell, P.E., Lubiw, A., Morphing Schnyder drawings of planar triangulations, *22nd International Symposium on Graph Drawing* (C. Duncan, A. Symvonis, eds.), LNCS 8871 (2014), 294–304
6. A. Graf, D.G. Harris, P. Haxell, Algorithms for weighted independent transversals and strong colouring, *Proceedings of the 2021 ACM-SIAM Symposium on Discrete Algorithms (SODA21)*, 662–674.

Book chapters:

1. Haxell, P.E., Independent transversals and hypergraph matchings - an elementary approach, in *Recent Trends in Combinatorics*, IMA Volumes on Mathematics and its Applications 159 (Beveridge, A., Griggs, J., Hogben, L., Musiker, G., Tetali, P. eds.), Springer 2016.
2. Haxell, P.E., Topological connectedness and independent sets in graphs. *Surveys in Combinatorics* 2019, London Math. Soc. Lecture Note Series 456, Cambridge Univ. Press, Cambridge, 2019, 89–113.

Patents:

1. Haxell, P.E., Wilfong, G.T., Winkler, P.M., Time-domain wavelength interleaved network with communications via hub node, US Patent 7720382. Issued May 18 2010, filed April 16, 2004.

PhD students and postdocs supervised (with completion dates):

1. Martin Pei, PhD 2008
2. Jessica McDonald, PhD 2009
3. Fidel Barrera-Cruz, PhD 2014
4. Michael Szestopalow, PhD 2016
5. Alessandra Graf, PhD 2019
6. Ronen Wdowinski, in progress
7. Reza Naserasr, postdoc 2008
8. Martin Pei, postdoc 2010
9. Lothar Narins, postdoc 2017

Masters students supervised (with completion dates – since 2010 only):

1. Fidel Barrera-Cruz, 2010
2. Michael Szestopalow, 2010
3. Georg Osang, 2013
4. Grace Petersen, 2017
5. Kris Siy, 2018
6. Andrew Jay, 2019
7. Ronen Wdowinski, 2021
8. Rana Saleh, 2021
9. Colter MacDonald, in progress

Course taught (since 2016 only):

1. Math239 (Introduction to Combinatorics): F16 (2 sections), W17, S19, F19
2. CO342 (Introduction to Graph Theory): S19, S20, F20

3. CO442/642 (Graph Theory): F19
4. CO749 (Graduate Topics: Topological Methods in Combinatorics): W17

Distinguished lectures or plenary addresses at major international conferences (since 2010 only):

1. Hypergraphs of low dimension. SIAM Conference on Discrete Mathematics, Austin, Texas, USA, 2010
2. Morphing planar graph drawings. Czech-Slovak International Symposium on Graph Theory Combinatorics, Algorithms and Applications, Kosice, Slovakia, 2013
3. Matchings in tripartite hypergraphs. ACCMCC (Australian Conference on Combinatorial Mathematics and Combinatorial Computing), Brisbane, Australia, 2015
4. Matchings in hypergraphs. TWIM (Tel Aviv Women in Mathematics) Distinguished Lecture Series, Tel Aviv, Israel 2016
5. Matchings in tripartite hypergraphs, 47th Southeastern International Conference of Combinatorics, Graph Theory and Computing, Boca Raton FL, USA 2016
6. Edge colouring multigraphs, 47th Southeastern International Conference of Combinatorics, Graph Theory and Computing, Boca Raton FL, USA 2016
7. Chromatic index of random multigraphs. RSA (Random Structures and Algorithms), Gniezno, Poland 2017
8. Topological connectedness and independent sets in graphs (Richard Rado Lecture), British Combinatorial Conference, Birmingham UK, 2019
9. Gehman Lecture at MAA Seaway Section, Waterloo May 1 2020 - CANCELLED
10. Plenary lecture at the Renyi Institute of the Hungarian Academy of Sciences special anniversary meeting, Budapest, Hungary September 2020 - CANCELLED

Public lecture:

1. Come sail away: math for the cruise director, US National Museum of Mathematics (MOMATH), Math Encounters series, New York NY, March 4 2020

Professional Activities

Conference Organisation:

1. Program committee member for FPSAC 2001, CanaDAM 2009, CanaDAM 2011, EUROCOMB 2011, CanaDAM 2013, SIAM Discrete 2020
2. Session organiser for SIAM Discrete 2004, CMS Summer meeting 2005, CanaDAM 2007, CanaDAM 2011, SIAM Discrete 2012, SIAM Discrete 2020
3. Main organiser or co-organiser for Regularity of Hypergraphs (BIRS 2003), Watermellon 2009, Sparse Pseudorandom Structures (BIRS 2010), Hypergraph Turán Problem (MFO Oberwolfach miniworkshop 2012), New Trends and Directions in

Combinatorics (BIRS 2012), Methods and Challenges in Extremal and Probabilistic Combinatorics (BIRS 2015), Workshop on Probabilistic and Extremal Combinatorics (BIRS 2019)

4. Co-organiser for special year at IMA Minneapolis on Discrete Structures: Analysis and Applications, Sept 2014-May 2015.

Society service:

July 1997–2001, Canadian Mathematical Society Board of Directors

2012–2014, Member of scientific review panel for AARMS (Atlantic Association for Research in the Mathematical Sciences)

Editorial positions:

1998–2005, joint managing editor, Journal of Combinatorial Theory B

2006–present, editorial board member, Journal of Combinatorial Theory B

2008–present, editorial board member, Random Structures and Algorithms

2009–present, editorial board member, Journal of Combinatorics

2013–present, editorial board member, Electronic Journal of Combinatorics

2018–present, editorial board member, Journal of Graph Theory

2020–present, editorial board member, Studia Scientiarum Mathematicarum Hungarica: Combinatorics, Geometry and Topology

Other service:

2018, Member of Expert Panel for candidate evaluation, Korean Institute of Basic Sciences

2021, Member of Expert Panel for candidate evaluation, Korean Institute of Basic Sciences

2016–present, External Expert for Department of Mathematics, London School of Economics

Refereeing activities:

1. Refereeing of many papers for combinatorial and computing journals (5-10 per year), including Combinatorica, Journal of Combinatorial Theory (Series B), Combinatorics, Probability and Computing, Random Structures and Algorithms, SIAM Journal of Computing, SIAM Journal on Discrete Mathematics, Journal of Graph Theory, Discrete Mathematics, Discrete Applied Mathematics, Graphs and Combinatorics, Journal of Combinatorial Designs, Journal of Combinatorics, Journal of Algebraic Combinatorics, Electronic Journal of Combinatorics, Australasian Journal of Combinatorics, and Journal of Combinatorial Optimization, as well as articles for special volumes and conference proceedings.
2. Refereeing of NSERC, ISF and NSA research grant applications.