

Peter Nelson

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Basic Information

Born on January 2, 1986.

Citizen of New Zealand, Permanent Resident of Canada

Employment

Current

Assistant Professor, Department of Combinatorics and Optimization, University of Waterloo, Jul 2015–.

Past

Postdoctoral Fellow, Department of Combinatorics and Optimization, University of Waterloo, May 2014–Jun 2015.

Postdoctoral Fellow, Victoria University of Wellington, Jul 2012–Apr 2014.

Teaching Fellow, Victoria University of Wellington, Jan 2012–Jun 2012.

Teaching Assistant and Tutorial Instructor, University of Waterloo, Sep 2007–Dec 2011.

Education

Ph.D., Combinatorics and Optimization, University of Waterloo, 2012.

B.Sc (Hons) Mathematics, University of Auckland, 2007.

Awards

NSERC Discovery Grant, 2016–

UW/Bordeaux Research Grant, 2016.

Supervision

Completed

Zachary Walsh (MMath), Sep 2015–Dec 2016

Alessandra Graf (MMath), Sep 2015–Dec 2016 (co-supervised)

Rutger Campbell (URA), May–Aug 2014 (co-supervised)

Rutger Campbell (URA), May–Aug 2013

Current

Sophia Park (MMath), Sep 2016–

Kazuhiro Nomoto (Ph.D.), Sep 2016–

Zachary Walsh (Ph.D.), Jan 2017–

Adam Brown (URA), May 2017–

Approved Doctoral Dissertation Supervisor status, 2017.

Publications

Appeared

Jim Geelen and Peter Nelson, *The structure of matroids with a spanning clique or projective geometry*, Journal of Combinatorial Theory Series B 127 (2017), 65–81.

Jim Geelen and Peter Nelson, *The densest matroids in minor-closed classes with exponential growth rate*, Transactions of the American Mathematical Society 369 (2017), 6751–6776

Jim Geelen and Peter Nelson, *Odd circuits in dense binary matroids*, Combinatorica 37 (2017), 41–47.

Peter Nelson and Stefan van Zwam, *The maximum-likelihood decoding threshold for cycle codes of graphs*, IEEE Transactions in Information Theory 62 (2016), 5316–5322.

Peter Nelson, *On the probability that a random subgraph contains a circuit*, Journal of Graph Theory 85 (2016), 644–650

Jim Geelen and Peter Nelson, *The critical number of dense triangle-free binary matroids*, Journal of Combinatorial Theory, Series B 116 (2016), 238–249.

Jim Geelen and Peter Nelson, *Matroids denser than a clique*, Journal of Combinatorial Theory, Series B 114 (2015), 51–69.

Jim Geelen and Peter Nelson, *The number of lines in a matroid with no $U_{2,n}$ -minor*, European Journal of Combinatorics 50 (2016), 115–122.

Peter Nelson and Stefan van Zwam, *Matroids representable over fields with a common subfield*, SIAM Journal on Discrete Mathematics 29 (2015), 796–810.

Peter Nelson, *Projective geometries in exponentially dense matroids. II*, Journal of Combinatorial Theory, Series B 113 (2015), 208–219.

Jim Geelen and Peter Nelson, *Projective geometries in exponentially dense matroids. I*, Journal of Combinatorial Theory, Series B 113 (2015), 185–207.

Peter Nelson, *Matroids denser than a projective geometry*, SIAM Journal on Discrete Mathematics 29 (2015), 730–735.

Jim Geelen and Peter Nelson, *An analogue of the Erdős-Stone Theorem for finite geometries*, Combinatorica 35 (2015), 209–214.

Jim Geelen and Peter Nelson, *A density Hales-Jewett theorem for matroids*, Journal of Combinatorial Theory, Series B 112 (2015), 70–77.

Peter Nelson and Stefan van Zwam, *On the existence of asymptotically good linear codes in minor-closed classes*, IEEE Transactions in Information Theory 61 (2015), 1153–1158.

Peter Nelson, *The number of rank- k flats in a matroid with no $U_{2,n}$ -minor*, Journal of Combinatorial Theory, Series B 107 (2014), 140–147.

Jim Geelen and Peter Nelson, *On minor-closed classes of matroids with exponential growth rate*, Advances in Applied Mathematics 50 (2013), 142–154.

Peter Nelson, *Growth rate functions of dense classes of representable matroids*, Journal of Combinatorial Theory, Series B 103 (2013), 75–92.

Jim Geelen and Peter Nelson, *The number of points in a matroid with no n -point line as a minor*, Journal of Combinatorial Theory, Series B 100 (2010), 625–630.

Michael Brough, Bakhadavr Khossainov and Peter Nelson, *Sequential automatic algebras*, Computability in Europe (2008), 84–93.

Submitted

Peter Nelson and Zachary Walsh, *The extremal function for geometry minors of matroids over prime fields*. (25 pages)

Peter Nelson, *Almost all matroids are non-representable*. (4 pages)

Tony Huynh and Peter Nelson, *The matroid secretary problem for minor-closed classes and random matroids*. (11 pages)

Invited Talks

International Workshop on Structure in Graphs and Matroids, 2016.

SIAM Conference on Discrete Mathematics, 2016.

Canadian Discrete and Algorithmic Mathematics Conference, 2015.

Combinatorics Seminar, Louisiana State University, 2014.

International Workshop on Structure in Graphs and Matroids, 2014.

Tutte Seminar, University of Waterloo, 2014.

Combinatorics Seminar, University of Western Australia, 2013.

Combinatorics Seminar, University of Auckland, 2013.

Maastricht Workshop on Graphs and Matroids, 2012.

Discrete Math Seminar, Princeton University, 2012.

Discrete Math Seminar, Columbia University, 2012.

Discrete Math Seminar, Rutgers University, 2012.

New York Combinatorics Seminar, 2012.

Tutte Seminar, University of Waterloo, 2012.
Joint Mathematics Meetings, 2011.
Vacquerie Matroid Workshop, 2011.
Matroid Seminar, University of Waterloo, 2011.
Matroid Seminar, Victoria University of Wellington, 2011.
Siam Conference on Discrete Mathematics 2010.
Maastricht Workshop on Graphs and Matroids, 2010.
Tutte Seminar, University of Waterloo, 2010.

Teaching

University of Waterloo

Instructor, CO 446/646 (Matroid Theory), Spring 2017.
Instructor, CO 331 (Coding Theory), Winter 2017.
Instructor, MATH 135 (Algebra for Honours Students), Fall 2016.
Instructor, CO 331 (Coding Theory), Winter 2016.
Instructor, MATH 239 (Introduction to Combinatorics), Spring 2015.
Instructor, MATH 239 (Introduction to Combinatorics), Spring 2014.
Instructor, CO 446/646 (Matroid Theory) Spring 2013.
Teaching assistant and tutorial instructor, various courses, Sep 2007–Dec 2011.

Victoria University of Wellington

Lecturer, Math 261 (Discrete Mathematics 2), Victoria University of Wellington, first semester 2013.
Lecturer, Math 353 (Optimization), Victoria University of Wellington, first semester 2012.
Lecturer, Math 261 (Discrete Mathematics 2), Victoria University of Wellington, first semester 2012.

Professional Service

Mathematics Faculty Representative, Faculty of Science, University of Waterloo, Sep 2015–Sep 2016.
Mathematics Faculty Representative, Faculty of Applied Health Science, University of Waterloo, Sep 2016–.
Department of Combinatorics and Optimization Graduate Committee Member, Sep 2016–.

Other

Organiser, SiGMA 2017

Organiser of invited session, Canadam 2017

Organiser, Vacquerie Workshop in Structural Matroid Theory, 2015.

Deputy Leader and Team Trainer, New Zealand Mathematical Olympiad Program Jan 2012–Dec 2013.

Graduate Student Representative, Department of Combinatorics and Optimization, University of Waterloo 2011.