

Worcester Polytechnic Institute  
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*Citizenship:* Canadian  
*Languages:* English, some French

**Research Interests**

discrete geometry, rigidity theory, tilings, topological graph theory, architectural geometry, symmetry, combinatorics, computational geometry, mathematical biology, mathematical crystallography, interdisciplinarity

**Current Positions**

Technical Specialist, Mesh Consultants, Fields Institute, Toronto  
(geometry consulting for the digital design industry)  
September 2014 - present

Affiliate Postdoctoral Scholar, Department of Mathematical Sciences, Worcester Polytechnic Institute, Worcester (Not on site or teaching)  
October 2014 – present

**Positions Held**

Postdoctoral Scholar, Department of Mathematical Sciences, Worcester Polytechnic Institute, Worcester  
January 2014 – October 2014

(Maternity leave, April 2012 – January 2014.)

Postdoctoral Fellow, Department of Mathematics and Statistics, York University, Toronto  
January 1, 2012 – April 1, 2012

Postdoctoral Fellow, Fields Institute, Toronto  
Thematic Program on Discrete Geometry and Applications  
July 1, 2011 – December 31, 2011

**Education**

Ph.D. Mathematics, York University, 2006 – 2011  
Thesis: *Geometric and combinatorial rigidity of periodic frameworks as graphs on a torus.*  
Supervisor: Walter Whiteley

M.Sc. Mathematics, University of British Columbia, 2003 – 2005  
Thesis: *The non-local growth of Penrose tilings.*  
Supervisor: William Casselman

B.Sc. Mathematics, University of Guelph, 1999 – 2003, *With Distinction*  
Minor Studio Art

**Honours and Awards***National and Provincial*

Ontario Graduate Scholarship, 2009 - 2010

Ontario Graduate Scholarship in Science and Technology (OGSST), 2008 - 2009

NSERC PGS M, 2004 - 2005

*Communication*

Peter Rodney Memorial Book Prize for best student talk, Ontario Combinatorics Workshop, University of Waterloo, May 2009

*Institutional*

Travel Award, Graduate Development Fund, Faculty of Graduate Studies, York University, September 2009

NSERC Top-up award, Department of Mathematics, University of British Columbia, 2004 - 2005

Special Graduate Entrance Scholarship, September 2003

University of Guelph Department of Mathematics Book Award for Academic Excellence, (3 awards: 2000, 2001, 2002)

University of Guelph Department of Mathematics Year Two Award, November 2001

**Publications**

1. *Periodic rigidity on a variable torus using inductive constructions*, with A. Nixon (submitted).
2. *Inductive constructions for frameworks on a two-dimensional fixed torus*, (submitted).
3. *Geometric rigidity of graphs on the torus*, (Extended abstract), with B. Servatius and H. Servatius. Proceedings of the 24th Fall Workshop on Computational Geometry, 2014.
4. *The rigidity of periodic frameworks as graphs on a fixed torus*, Contributions to Discrete Mathematics, 9(1), 2014.
5. *One brick at a time: a survey of inductive constructions in rigidity theory*, with A. Nixon. Fields Communications Series volume 70, "Rigidity and Symmetry" edited by Robert Connelly, Asia Weiss and Walter Whiteley, 2014.
6. *The rigidity of periodic body-bar frameworks on the three-dimensional fixed torus*, Philosophical Transactions of the Royal Society A, 372 (2008), 2014.
7. *The Rigidity of Spherical Frameworks: Swapping Blocks and Holes*, with W. Finbow, and W. Whiteley, SIAM Journal on Discrete Mathematics, 26(1), 280 – 304, 2012.
8. *Finite motions from periodic frameworks with added symmetry*, with B. Schulze and W. Whiteley, International Journal of Solids and Structures, 48, 1711 – 1728, 2011.

**Selected Presentations** (★ by invitation)

- ★ University of Wyoming, upcoming.
- ★ Algebraic Combinatorics Seminar, Colorado State University, 2014
- ★ AMS Special Session on Discrete Geometry and Crystallography, Baltimore, 2014
- ★ Discrete Math Seminar, Worcester Polytechnic Institute, 2014
- ★ Royal Society Theo Murphy International Scientific Meeting on Rigidity of Periodic and Symmetric Structures in Nature and Engineering, England, 2012
- ★ CMS Special Session on Discrete Geometry, Toronto, 2011
- ★ Workshop on Rigidity and Symmetry, Fields Institute, 2011
- Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM), Victoria, 2011
- ★ Carleton-Ottawa Discrete Math seminar, 2011
- Geometry Day, York University, 2011
- ★ Rigidity in Lancaster, England, 2010
- ★ CMS Special Session on Discrete Geometry, Fredericton 2010
- Rigidity Day, York University, 2010
- ★ CMS Special Session on Recent Trends in Discrete Geometry, Windsor, 2009
- ★ Workshop on Rigidity and Volume Inequalities, Budapest, 2009
- Ontario Combinatorics Workshop, University of Waterloo, 2009
- ★ AMS Special Session on Discrete Geometry, Worcester, 2009
- ★ Discrete Geometry Day, Field's Institute, 2009
- ★ Discrete Geometry and Combinatorics seminar, Cornell University, 2008
- ★ Recent Progress in Rigidity Theory, BIRS, 2008
- Rigidity seminar series, York University, 2007

**Conferences, Workshops & Research Visits** (in addition to those listed above)

- American Institute of Mathematics workshop “Configuration spaces of linkages,” 2014
- Fields Workshop on Discrete and Computational Geometry, Carleton University, Ottawa, 2010
- Research visit, Wendy Finbow, St. Mary's University in Halifax, 2010
- Canadian Science Policy Conference, Toronto, 2009
- Rigidity, Flexibility, and Motion: Theory, Computation and Applications to Biomolecules, BIRS, 2008
- Connecting Women in Mathematics Across Canada, The Fields Institute, 2006
- The Coxeter Legacy: Reflections and Projections, The Fields Institute, 2004

**Teaching Activities**

*Instructor*, MA 1024: Calculus IV, Worcester Polytechnic Institute, 2014

*Instructor*, MA 2073: Introduction to Matrices and Linear Algebra II, Worcester Polytechnic Institute, 2014

*Course Director*, MATH 2022: Linear Algebra II, York University, 2010

*Tutorial Leader*, MATH 3050: Introduction to Geometries; and MATH 1200: Problems, Conjectures and Proofs; York University, 2010

*Tutor*, Math Lab, York University, 2006 – 2008

*Tutorial Leader and Occasional Guest Instructor*, MATH 1300: Differential Calculus with Applications, York University, 2007

*Teaching Assistant*, MATH 1014: Applied Calculus II, York University, 2007

*Teaching Assistant*, MATH 3410: Complex Analysis, York University, 2007

*Teaching Assistant*, various calculus courses, University of British Columbia, 2003 - 2005

*Tutor*, The Academy for Mathematics and Science, Guelph, 2000 - 2003

**Teaching-related Professional Development**

University Teaching Practicum, York University, 2007 – 2011

Completion of a self-directed program of professional development in university teaching and learning, through the Centre for the Support of Teaching.

**Professional Experience**

*Teaching Development Graduate Assistant* Sep 2009 – Dec 2009  
Organizer and facilitator of an orientation for new teaching assistants in the mathematics department, attended by over 40 TAs. Initiated and facilitated a four-part seminar series connecting researchers in mathematics education with TAs and faculty in the mathematics department.

*Math Lab Coordinator* Sep 2008 – April 2009  
Responsible for the administration of York University's math help centre (Math Lab), and management of 20 tutors.

**Service**

*Referee and Review*

MathSciNet

European Journal of Combinatorics

International Journal of Structures and Solids

Philosophical Transactions of the Royal Society A

ACM-SIAM Symposium on Discrete Algorithms (SODA 2012)

27th Annual Symposium on Computational Geometry (SoCG 2011)

**Service, continued***Organizer or co-organizer of*

“Making Models: Stimulating Research In Rigidity Theory And Spatial-Visual Reasoning”,  
workshop at the Fields Institute, August 5 - 9, 2014

Discrete Geometry session, Canadian Mathematical Society Winter Meeting, Toronto 2011

“Art Meets Science”, York University, 2009 – 2010

*Committee*

Faculty of Graduate Studies Council, York University, 2010 – 2011

Tenure and Promotion Committee, Department of Mathematics, York University, 2010 – 2011

Teaching and Learning Committee, Department of Mathematics, York University, 2009 – 2010

Department Council (Graduate Student Representative), York University, 2009 – 2010

Graduate Executive Committee, Department of Mathematics, York University, 2008 – 2009

*Other*

Contributor to “Fields Notes”, newsletter of the Fields Institute, December 2011

**References**

1. **Walter Whiteley** (Ph.D. supervisor) whiteley@mathstat.yorku.ca  
*York University, Toronto, Canada*
2. **Robert Connelly** connelly@math.cornell.edu  
*Cornell University, Ithaca, U.S.A*
3. **Brigitte Servatius** bservat@wpi.edu  
*Worcester Polytechnic Institute, Worcester, U.S.A*
4. **Daniel Hambleton** daniel.hambleton@meshconsultants.ca  
*Mesh Consultants, Fields Institute, Toronto, Canada*
5. **Stephen Power** s.power@lancaster.ac.uk  
*University of Lancaster, Lancaster, U.K.*
6. **Mike Zabrocki** (concerning teaching) zabrocki@mathstat.yorku.ca  
*York University, Toronto, Canada*
7. **Asia Weiss** (Ph.D. committee member) weiss@mathstat.yorku.ca  
*York University, Toronto, Canada*
8. **Bernd Schulze** b.schulze@lancaster.ac.uk  
*University of Lancaster, Lancaster, U.K.*
9. **William Casselman** (Master’s thesis supervisor) cass@math.ubc.ca  
*University of British Columbia, Vancouver, Canada*

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