Elissa Ross — Curriculum Vitae

MESH Consultants Inc.
Fields Institute
222 College St
Toronto, Canada M5J 3J1
(647) 546-9597

elissa.ross@meshconsultants.ca
http://www.elissaross.ca

Citizenship: Canadian
Languages: English, some French

Research Interests

design computation · discrete geometry · shape modelling · CAD software development · architectural geometry · scientific simulation · rigidity theory · computational geometry · tilings · mathematical and computational crystallography · interdisciplinarity

Current Positions

Principal
MESH Consultants Inc., Toronto
Oct 2017 - present
&
Visiting Researcher
Fields Institute for Research in the Mathematical Sciences, Toronto
May 2015 - present

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

Positions Held

Senior Associate & OCE TalentEdge Postdoctoral Fellow, MESH Consultants Inc., Toronto
May 2015 - October 2017

Technical Specialist, MESH Consultants Inc., Toronto
September 2014 – May 2014

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

(Maternity leave, April 2012 – January 2014)

Positions Held, continued

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

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

Publications

1. *Beyond the model: toward a unified framework for geometry creation, visualization, interaction and iteration,* with D. Hambleton and C. Cappadocia. Submitted.
2. *Inductive constructions for combinatorial local and global rigidity,* with A. Nixon. Invited submission for the Handbook of Geometric Constraint Solving Principles, M. Sitharam, A. St. John and J. Sidman, editors, CRC Press. Submitted.
3. *Scaffolding a skeleton: quad meshing a convolution surface,* with E. Hubert, G. Morin, A. Panotopoulou and K. Welker. To appear in Proceedings of Women In Shape Modelling 2016.
4. *Face-offsetting polygon meshes with differential offset rates,* with D. Hambleton and R. Aish. Advances in Architectural Geometry, proceedings of the fifth AAG, ETH Zurich, 40 –61, 2016.
5. *Anchored boundary conditions for locally isostatic networks,* with L. Theran, A. Nixon, M Sadjadi, B, Servatius and M. Thorpe. Physical Review E., Vol 92(5), 2015.
6. *Exact face-offsetting of polygonal meshes,* with D. Hambleton. In Computational Ecologies: Design in the Anthropocene, proceedings of 35th ACADIA Conference, ed. L. Combs and C. Perry, ACADIA, Cincinnati, 203 – 209, 2015.
7. *Inductive constructions for frameworks on a two-dimensional fixed torus,* Discrete and Computational Geometry, 54(1), 2015.
8. *Periodic rigidity on a variable torus using inductive constructions,* with A. Nixon. Electronic Journal of Combinatorics, Vol 22(1), 2015.
9. *Geometric rigidity of graphs on the torus,* with B. Servatius and H. Servatius. Proceedings of the 24th Fall Workshop on Computational Geometry, 2014.
10. *The rigidity of periodic frameworks as graphs on a fixed torus,* Contributions to Discrete Mathematics, 9(1), 2014.
11. *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.
12. *The rigidity of periodic body-bar frameworks on the three-dimensional fixed torus,* Philosophical Transactions of the Royal Society A, 372 (2008), 2014.
13. *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.
14. *Finite motions from periodic frameworks with added symmetry,* with B. Schulze and W. Whiteley, International Journal of Solids and Structures, 48, 1711 – 1728, 2011.

Honours, Awards and Commissions

NSERC Engage Grant, with H. Huang, 2017.

Ontario Centres of Excellence TalentEdge Postdoctoral Fellowship, 2016 - 2017

Ontario Centres of Excellence TalentEdge Postdoctoral Fellowship, 2015 - 2016

Commissioned artwork with Patrick Ingram. Too Cool For School Exhibition, York Quay Gallery, The Harbourfront Centre, Toronto, November 2010 – January 2011. Though the Harbourfront Centre's national commissioning programme, Fresh Ground new works.

Ontario Graduate Scholarship, 2009 - 2010

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

NSERC PGS M, 2004 - 2005

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

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

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

Selected Presentations ($\star$ by invitation)

- $\star$ Guest Lecturer, Graduate Studio, Daniels Faculty of Architecture, University of Toronto, 2017.
- $\star$ Pecha Kucha presentation, Symposium on Simulation in Architecture and Urban Design, Toronto, 2017.
- $\star$ Department of Mathematics Colloquium, University of Oregon, 2017.
- $\star$ Applied Algebra Seminar, York University, 2017.
- $\star$ Advances in Architectural Geometry Symposium, ETH Zurich, 2016.
- $\star$ Women In Shape Modelling Turkey, 2016.
- $\star$ Computational Mathematics Colloquium, University of Waterloo, 2016.
- $\star$ Association for Computer Aided Design in Architecture Conference, Cincinnati OH, 2015.
- $\star$ Innovation Day, Fields Institute, 2015.
- $\star$ Algebraic Combinatorics Seminar, Colorado State University, 2014
- $\star$ AMS Special Session on Discrete Geometry and Crystallography, Baltimore, 2014
- $\star$ Discrete Math Seminar, Worcester Polytechnic Institute, 2014
- $\star$ Royal Society Theo Murphy International Scientific Meeting on Rigidity of Periodic and Symmetric Structures in Nature and Engineering, England, 2012
- $\star$ CMS Special Session on Discrete Geometry, Toronto, 2011

Selected Presentations, continued

⋆ Workshop on Rigidity and Symmetry, Fields Institute, 2011
– Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM), Victoria, 2011
⋆ Carleton-Ottawa Discrete Math seminar, 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

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

Women in Shape-2: Modelling Boundaries of Objects in 2- and 3-Dimensions, Nesin Mathematics Village, Turkey, 2016

Advances in Combinatorial and Geometric Rigidity, Banff International Research Station, 2015

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

Rigidity, Flexibility, and Motion: Theory, Computation and Applications to Biomolecules, BIRS, 2008

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 Activities, continued

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

Outreach

Keynote speaker, "Girls in STEM" conference, University of Toronto, May 2016

Contributor to "Research Notes", in the "CMS Notes", March 2016

Contributor to "Fields Notes", newsletter of the Fields Institute, December 2011

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

Referee and Review

Advances in Architectural Geometry 2018, papers committee

Math Reviews

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)

Service, continued

27th Annual Symposium on Computational Geometry (SoCG 2011)

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

References

Available upon request.