

ORTHO FLINT
Curriculum Vitae
(updated June 23, 2010)

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RESEARCH INTERESTS

- Graph theory
- Combinatorics
- Complexity theory
- Knot theory
- Geometry

For details please go to my website: <http://www.math.uwo.ca/~ortho/website.html>

EDUCATION

- Spring 2007 **Ph. D. in Mathematics**, University of Western Ontario, London, Canada.
THESIS: *The Master Array, a complete invariant for prime alternating links*
ADVISOR: Prof. Stuart A. Rankin
- Spring 2003 **Master of Arts (in Mathematics)**, University of Western Ontario, London, Canada.
TOPIC: *Knot theory*
ADVISOR: Prof. Stuart A. Rankin

PUBLICATIONS AND PREPRINTS

Published papers

1. Ortho Flint, Stuart Rankin, and John Schermann, Enumerating the prime alternating knots I, *Journal of Knot Theory and its Ramifications* 13 (2004), no. 1, 57–100.
2. Ortho Flint, Stuart Rankin, and John Schermann, Enumerating the prime alternating knots II, *Journal of Knot Theory and its Ramifications* 13 (2004), no. 1, 101–149.
3. Ortho Flint, Stuart Rankin, Enumerating the prime alternating links, *Journal of Knot Theory and its Ramifications* 13 (2004), no. 1, 151–173.

Preprints (only available by request)

4. The Master Array: A complete invariant for prime alternating links.
5. Enumerating the prime alternating links II.
6. Bounds on the number of minimal diagrams of a prime alternating link.
7. A polynomial time algorithm for Graph Isomorphism of certain graphs.
8. Labelled Trees: A cycle decomposition scheme for graphs.
9. An equivalent formulation of the four colour theorem.
10. Assessment with BACI designs.
11. An algorithm for model order reduction of networks.

Work in progress

12. Symmetries of prime alternating links.
13. Knotilus - Links on the Web.
14. GI testing in polynomial time.
15. Graph similarity and Graph kernels.
16. An algorithm for cubic tiling of n-dimensional manifolds.

SCHOLARSHIPS AND AWARDS

- **National Science and Engineering Research Council**
Canada Graduate Scholarship (Ph. D.) 2005-2007
- **National Science and Engineering Research Council**
Post Graduate Scholarship (Ph. D.) 2003-2004
- **National Science and Engineering Research Council**
Post Graduate Scholarship (Masters) 2002-2003
- **Faculty of Science Graduate Student Teaching Award**
The University of Western Ontario, 2005
- **Faculty of Science Graduate Student Teaching Award**
The University of Western Ontario, 2004

TEACHING EXPERIENCE• **Teaching Assistant experience**

Teaching Assistant for the two second year courses 222a and 223b covering Introductory logic, set theory, functions, group theory, coding theory, number theory, modular arithmetic and graph theory, Fall 2004- Fall 2006.

Teaching Assistant for all first year courses covering, Calculus, Linear Algebra, Geometry, Algebra and Finite Mathematics (Combinatorics and Probability theory), Fall 2001- Spring 2003.

• **Instructor for the following course with full responsibility**

Finite math (set, counting and probability theory), Math 1228b - Winter 2009.

Discrete Structures II, Math 223b - Winter 2007.

EXPERIENCE AND EMPLOYMENT

- Attended Industrial mathematical workshops throughout 2009/2010, and worked on problems ranging from graph comparing/similarity, graph kernels to financial problems and risk assessment.
- Assistant Professor and Postdoctoral Fellow at the University of Western Ontario, Canada, 2010.
- Instructor: Course 1228b (Finite math) for 200 plus first year social science students, Winter term 2009.
- Attended numerous Industrial mathematical workshops throughout 2008, and worked on problems ranging from semi conductor research to oncology, solving one problem in its entirety.
- Enumerated all the prime alternating knots and links at 24 crossings (around 500 billion) and enumerated all the oriented prime alternating knots and links at 24 crossings (around 2.5 trillion) in 40 hours distributed over 40 machines, Fall 2007.
- Instructor: Course 223b (Discrete Structures II) for computer science honour students, Winter term 2007.

- Enumerated all the prime alternating knots and links up to 23 crossings (around 100 billion) and enumerated all the oriented prime alternating knots and links up to 23 crossings (around 500 billion) in 19 days on a modern desktop, Fall 2006.
- Launched the new interactive website “Knotilus” for knot and link visualization and design, Fall 2006.
- Classified the knotted molecules made from synthetic DNA for Ned Seeman’s lab at New York University, Summer 2006.
- Launched the original interactive website “Knotilus” for knot and link visualization and design, Summer 2003.
- Researcher in Knot theory and Graph theory at the University of Western Ontario, Canada, Fall 2001 - present.
- Teaching Assistant at the University of Western Ontario, Canada, Fall 2001 - Fall 2006.
- Research Associate with Prof. Greg Reid at the University of Western Ontario, Canada, to devise algorithms for rooted tree constructions and enumeration, Summer 2001.
- Researcher in the Department of Applied Mathematics at the University of Western Ontario, Canada, unsupervised, Winter 2000.
- Researcher in the Department of Applied Mathematics at the University of Western Ontario, Canada, cryptography research, unsupervised, Spring and Summer 1999.
- Researcher in the Department of Applied Mathematics at the University of Western Ontario, Canada, algorithm for mapping n-cubes onto the plane, unsupervised, Summer 1998.
- Professional artist in Canada living in London Ontario, in United States living in New York, in Europe living in Budapest, Hungary.

TALKS AT MEETINGS AND CONFERENCES

- June 4, 2010: Canadian Mathematical Society meeting, University of New Brunswick, Fredericton, NB, Canada “Graph Isomorphism Testing”.
- August 8, 2008: Fields Institute, University of Toronto, Toronto, Ontario, Canada “NXP Semiconductor Problem: Model Order Reduction”. Joint talk with Suzanne Shontz.
- October 11, 2007: three hour talk entitled “Knot Theory and its Applications” to the IEEE computer and engineering in medicine and biology society.
- December 3, 2003: two hour talk on knot theory for the Graduate Mathematical Physics Society.
- March 25, 1999: two hour talk entitled “Computational Knot Theory” to the Departments of Statistics and Applied Mathematics at the University of Western Ontario, Canada.

TALKS IN SEMINARS AND COLLOQUIA

- October 2004: I gave eight talks on my research in knot theory for the Algebra Seminar Series at U.W.O.
- December 11, 2003: one day seminar given by me entitled “Exploring and Enumerating Alternating Knots and Links” at the University of Waterloo by invitation of visiting Professor L. Kauffman, University of Chicago.
- October 17, 2003: one hour talk on knot theory for the Mathematics Graduate Students Colloquia.
- March 3, 2000: one hour talk on my work in knot theory, in the seminar series on Symbolic Mathematical Computing sponsored by the Ontario Research Centre for Computer Algebra.

CONFERENCES AND WORKSHOPS ATTENDED

- MITACS: Workshop on Financial Networks and Risk Assessment, May 19-21, 2010.
- WaterMellon Workshop on Extremal Graph Theory, May 21-23, 2009.

- Workshop on Quantitative Cancer Modelling: Mathematical Models, Imaging and Bioinformatics, August 25-27, 2008.
- Fields-MITACS Industrial Problem-Solving Workshop (FMIPW), August 11-15, 2008.
- 2008 PIMS Industrial Problem Solving Workshop, June 9-21, 2008.
- The Graduate Student topology conference, Indiana University, Bloomington, april 1-2, 2006.
- ACM/IEEE SC99 Conference November 13-19, 1999 Portland, Oregon. Invited conference participation.

PROFESSIONAL MEMBERSHIPS

- American Mathematical Society, since 2001.
- Mathematical Association of America, since 2001.

REFERENCES

Stuart Rankin (*Advisor*)
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