Patrick Naylor

Curriculum Vitae

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Research Interests:

Low dimensional and geometric topology: in particular, questions about 3– and 4–manifolds, knotted surfaces, and trisections of 4–manifolds.

Employment

2021–2023	**Postdoctoral Research Fellow**, *Princeton University*

Education

2016–2021	**PhD, Pure Mathematics**, *University of Waterloo*
	Thesis: Trisections of non-orientable 4–manifolds. Advised by Doug Park.
2015–2016	**MMath, Pure Mathematics**, *University of Waterloo*
2011–2015	**BSc Honours, Pure Mathematics**, *University of Manitoba*

Research Visits

Fall 2019	**Visiting Student**, *Max Planck Institute for Mathematics*
Fall 2018	**Visiting Student**, *University of Georgia*

Awards and Honours

2021–2023	**NSERC Postdoctoral Fellowship**, *Princeton University*
2021	**Ontario Graduate Scholarship**, *University of Waterloo*
2017–2020	**NSERC Alexander Graham Bell CGS-D Scholarship**, *University of Waterloo*
	Awarded to top NSERC doctoral scholarship applicants
2016–2020	**President's Graduate Scholarship**, *University of Waterloo*
2018	**NSERC CGS-D MSFSS Scholarship**, *University of Waterloo*
	Awarded to support research experience abroad
2018	**David Johnston International Experience Award**, *University of Waterloo*
2016	**NSERC CGS-M Scholarship**, *University of Waterloo*
2015	**Special Graduate Scholarship**, *University of Waterloo*
2013, 2014	**Agnes Stewart Hart Award in Mathematics**, *University of Manitoba*
	Awarded for high standing in an Honours Mathematics program
2013	**Faculty of Science Undergraduate Research Award**, *University of Manitoba*
2013	**Track & Field/Cross Country Athletic Award**, *University of Manitoba*
2012, 2013	**President's Scholarship**, *University of Manitoba*
2011	**Canadian Association of Physicists Award**
	For high performance on the CAP national physics contest.

Papers and Preprints

7. **Trisections of non-orientable 4–manifolds**, with M. Miller. arXiv:2010.07433. Submitted.

6. **Multisections of 4–manifolds**, with G. Islambouli. arXiv:2010.03057. Submitted.

5. **Negacylic weighing matrices**, with R. Craigen, C. Desmarais, and T. Eaton. Submitted.

4. **Trisection diagrams and twists of 4–manifolds**, arXiv:1906.0149. To appear in Comptes Rendus Mathématique.

3. **Gluck twisting roll-spun knots**, with H. Schwartz. arXiv:2009.05703. To appear in Algebraic & Geometric Topology.

2. **From automorphisms of Riemann surfaces to smooth 4–manifolds**, with A. Beyaz, S. Onaran, and D. Park. *Math. Res. Lett.* 27(3), 629-645, 2020.

1. **Testing bi-orderability of knot groups**, with A. Clay, and C. Desmarais. *Canad. Math. Bull.* 59(3), 472-482, 2016.

Organizational Activities

Apr 2022	Co-organizing "Special Session on Knot Theory in Dimension Four," at the virtual Joint Mathematics Meetings (with Jeffrey Meier and Maggie Miller).
2022–	Co-organizer of the Princeton Topology Seminar (with Hannah Schwartz)

Service and Extracurricular

2021–	**Scholarships & Fellowships Selection Committee**, *NSERC* Committee for PDF and PGS-D/CGS-D awards in the Mathematical Sciences
2020–	**CEMC Contest Committee**, *CEMC, University of Waterloo* Committee to generate contest problems for national high school math contests.
2020–	**CEMC Problem of the Month Committee**, *CEMC, University of Waterloo* Committee to generate difficult "problems of the month" for enthusiastic high school students across Canada.
2020–	**Math Circles Presenter**, *CEMC, University of Waterloo* Ran math enrichment workshops for high school students, organized by the *Center for Education in Math and Computing* (CEMC) at the University of Waterloo.
2016–	**Math Contest Marker**, *CEMC, University of Waterloo* Marker for national high school math contests run by the University of Waterloo.
2013–2015	**Undergraduate Research Assistant**, *Department of Mathematics, University of Manitoba* with Adam Clay in 2014 and 2015, with Andriy Prymak in 2014, and with Robert Craigen in 2013.

Teaching and Mentorship

Spring 2022	**Preceptor**, *Princeton University* Mat 204: Advanced Linear Algebra with Applications
Spring 2020	**Instructor**, *University of Waterloo* Math 235: Linear Algebra 2 for Honours Math (Online)
2020	**Camp Euclid Mentor**, *Euclid Lab* Mentor for an online mathematical research enrichment program for high school students, organized by David Gay (University of Georgia).

2015–2021	**Teaching Assistant**, *Department of Pure Mathematics, University of Waterloo*
	TA for a wide variety of undergraduate, graduate, and online math courses.
2013–2015	**Teaching Assistant**, *Department of Mathematics/Statistics, University of Manitoba*
	TA for introductory mathematics and statistics courses.

Selected Talks

Jul 2021	Tech Topology Summer School (lightning talk) (online)
Mar 2021	Virtual Trisectors Seminar (online)
Nov 2020	MIT Topology Seminar (online)
Oct 2020	AMS Special Session on Knotted Surfaces and Concordances (online)
Sep 2019	Workshop on 4-manifolds (lightning talk), Max Planck Institute for Mathematics
Jun 2019	CMS Summer Meeting Topology Session, University of Regina
May 2019	Quantum Gravity Seminar, Perimeter Institute for Theoretical Physics
Mar 2019	Joint Pure Math and C&O Graduate Student Colloquium, University of Waterloo
Mar 2018	Geometry and Topology Seminar, McMaster University
Sep 2017	Pure Math Graduate Student Colloquium, University of Waterloo