

Patrick Naylor

Curriculum Vitae

University of Waterloo
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🌐 <https://www.patricknaylor.org>

Research Interests:

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

Education

- 2016–Present **PhD, Pure Mathematics**, *University of Waterloo*
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*

Papers and Preprints

8. N. Castro, P. Naylor, **Low complexity relative trisections**. In preparation.
7. M. Miller, P. Naylor, **Trisections of non-orientable 4-manifolds**. arXiv:2010.07433. Submitted.
6. G. Islambouli, P. Naylor, **Multisections of 4-manifolds**, arXiv:2010.03057. Submitted.
5. P. Naylor, H. Schwartz, **Gluck twisting roll-spun knots**, arXiv:2009.05703. Submitted.
4. P. Naylor, **Trisection diagrams and twists of 4-manifolds**, arXiv:1906.0149. Submitted.
3. R. Craigen, C. Desmarais, T. Eaton, P. Naylor, **Negacyclic Weighing Matrices**. Submitted.
2. A. Beyaz, P. Naylor, S. Onaran, D. Park, **From automorphisms of Riemann surfaces to smooth 4-manifolds**, *Math. Res. Lett.* 27(3), 629–645, 2020.
1. A. Clay, C. Desmarais, P. Naylor, **Testing bi-orderability of knot groups**, *Canad. Math. Bull.* 59(3), 472–482, 2016.

Awards and Honours

Academic

- 2021 **Ontario Graduate Scholarship**, *University of Waterloo*
- 2017–2020 **NSERC Alexander Graham Bell CGS-D Scholarship**, *University of Waterloo*
- 2016–2020 **President's Graduate Scholarship**, *University of Waterloo*
- 2018 **NSERC CGS-D MSFSS Scholarship**, *University of Waterloo*
- 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*
- 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.

Talks

Invited Talks

- 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

Selected Seminar Talks

- 2018-Present GT GAPS Seminar (online)
- 2019-Present Geometry Working Seminar, University of Waterloo
 - 2020 TQFT and Frobenius Algebras Learning Seminar, University of Waterloo
 - 2018 Topology Student Seminar, University of Georgia
- 2017–2018 Topology and Geometry Learning Seminar, University of Waterloo
- 2016–2018 Algebraic Geometry Learning Seminar, University of Waterloo
- 2015–2016 Ring Theory Learning Seminar, University of Waterloo

Conferences Attended

- Nov 2020 *Workshop on Link Homology and Concordance, Fields Institute (online)*
- Oct 2020 AMS Special Session on Knotted Surfaces and Concordances (online)
- Jun 2020 Virtual Summer Trisectors Workshop (online)
- Jun 2020 Nearly Carbon Neutral Geometric Topology Conference (online)
- Nov 2019 Unifying 4-dimensional Knot Theory, Banff International Research Station
- Sep 2019 Workshop on 4-manifolds, Max Planck Institute for Mathematics
- Jul 2019 Four manifolds: Confluence of High and Low Dimensions, The Fields Institute
- Jun 2019 Canadian Mathematical Society Summer Meeting, University of Regina
- Apr 2019 Spring Trisectors Meeting, University of Georgia
- Dec 2018 Virginia Topology Conference, University of Virginia
- Dec 2018 Canadian Mathematical Society Winter Meeting, Vancouver

- Jun 2018 Topology Students Workshop, Georgia Institute of Technology
- Mar 2018 1st Canadian Geometry and Topology Seminar, The Fields Institute
- Dec 2017 Canadian Mathematical Society Winter Meeting, University of Waterloo
- Dec 2016 Canadian Mathematical Society Winter Meeting, Niagara Falls

Teaching

- Spring 2020 **Instructor**, *University of Waterloo*
Math 235: Linear Algebra 2 for Honours Math (Online)
- 2015–Present **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.

Service and Extracurricular

- 2020–Present **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.
- 2020–Present **CEMC Contest Committee**, *CEMC, University of Waterloo*
Committee to generate contest problems for national high school math contests.
- 2020–Present **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.
- 2016–Present **Math Contest Marker**, *CEMC, University of Waterloo*
Marker for national high school math contests run by the University of Waterloo.
- 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).
- 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.
- 2012–2014 **CIS Academic All Canadian**, *University of Manitoba*
Maintaining an 80% average while competing on the varsity track team.
- 2009–2011 **National Triathlon Age Group Medalist**, *Kelowna, British Columbia*
Silver medalist (2009), and gold medalist (2010, 2011) in the U19 division.

Interests

Playing piano, track and field, cycling, being a master chef for departmental BBQs.