

# Patrick Naylor

## Curriculum Vitae

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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.

### 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*

2022 **Governor General's Academic Medal – Gold**, *University of Waterloo*

2022 **Mathematics Doctoral Prize**, *University of Waterloo*  
First place recipient in the Faculty of Mathematics

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.
- 2011 **Governor General's Academic Medal – Bronze**, *Miles Macdonnell Collegiate*

## 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. **Negacyclic 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

- Oct 2022 Co-organizing “Special Session on Knotted Surfaces and Concordances” at the 2022 AMS Fall Western Sectional Meeting (with Mark Hughes and Maggie Miller)
- Apr 2022 Co-organized “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

- Summer 2022 **Mentor**, *Princeton University*  
Mentor for undergraduate summer research program
- 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

- Apr 2022 University of Georgia Topology Seminar
- Apr 2022 Binghamton Topology Seminar
- 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