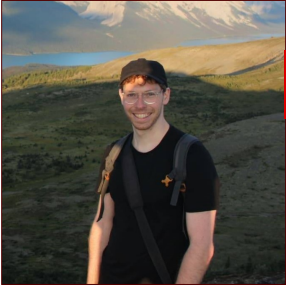


# FLORESTAN BRUNCK



## CONTACT INFORMATION

*Citizenship* French  
*Email* florestan.brunck@mail.mcgill.ca  
*Website* <https://florestan.xyz>

## RESEARCH INTERESTS

My broad research interests are in **computational and discrete geometry**. I enjoy thinking about **geometrical puzzles, tilings** and **reconfiguration problems**. Generally, I thrive on intuitive and motivated problems that are easily communicated but hard to solve.

## EDUCATION

**PHD, MATHEMATICS & COMPUTER SCIENCE** *2021-Ongoing*  
Institute of Science and Technology Austria (ISTA), Vienna.  
Supervisors: Herbert Edelsbrunner, Matthew Kwan and Uli Wagner.

**MASTERS OF MATHEMATICS** *2019-2021*  
McGill University, Montreal.  
Supervisors: Piotr Przytycki and Christophe Hohlweg.

**B.SC HONOURS IN MATHEMATICS & COMPUTER SCIENCE** *2016-2019*  
McGill University, Montreal - Joint Honours in Mathematics and Computer Science with a minor in music composition. Graduated with first class honours.

**CLASSES PRÉPARATOIRES AUX GRANDES ÉCOLES** *2011-2013*  
Lycee Louis le Grand, Paris - Intensive curriculum equivalent to the first 2 years of university with three concurrent majors : Mathematics, Physics and Engineering.

**BACCALAUREAT SCIENTIFIQUE** *2008-2011*  
Saint Cricq High School, Pau. Specialty in Mathematics.  
9th prize, Mathematical Olympiads - Académie de Bordeaux.

## PUBLICATIONS

ON THE NON-LOCALITY OF EDGE INSERTIONS *Submitted*  
(F. Brunck)

MY KINGDOM FOR A CYCLOGON! THE QUADRATURE OF A DISCRETE CYCLOID *Submitted*  
(F. Brunck)

BOOKS, HALLWAYS & SOCIAL BUTTERFLIES: A NOTE ON SLIDING BLOCK PUZZLES *Submitted*  
(F. Brunck, M. Kwan)

RECONFIGURING POPULAR FACES IN CURVED NONAGRAMS *In preparation*  
(F. Brunck, H.C. Chang, M. Löffler, T. Ophelders, L. Schlipf)

A GEOMETRIC ALGORITHM FOR COMPUTING THE WEAK-ORDER JOIN IN COXETER GROUPS *In preparation*  
(F. Brunck, C. Hohlweg)

COMPUTATION AND RECONFIGURATION IN LOW-DIMENSIONAL TOPOLOGICAL SPACES *Dagstuhl Seminar*  
(F. Buchin, A. Lubiw, A. de Mesmay, S. Schleimer, and F. Brunck)

ITERATED MEDIAL TRIANGLE SUBDIVISION IN SURFACES OF CONSTANT CURVATURE *Discrete & Computational Geometry* (F. BRUNCK)

ACUTE TRIANGULATION OF CONSTANT CURVATURE POLYGONAL COMPLEXES *Submitted*  
(F. BRUNCK)

## LANGUAGES

**ENGLISH**  
Native Fluency

**FRENCH**  
Native Fluency

**SPANISH**  
Beginner Fluency

## SELECTED COURSEWORK

### MATHEMATICS

Riemannian Geometry,  
Differential Geometry  
& Topology, Algebraic  
Topology, Ergodic & Ge-  
ometric Group Theory,  
Hyperbolic Geometry,  
Algebraic & Geometric  
Combinatorics. Discrete  
& Polyhedral Geometry.  
Topological Methods in  
Discrete Mathematics and  
Computer Science, Ad-  
vanced Probability Theory,  
The Probabilistic Method,  
Discrete Morse Theory.

### COMPUTER SCIENCE

Algorithm Design, Al-  
gorithmic Game Theory,  
Advanced Theory of Com-  
putation, Information and  
Algorithmic Information  
Theory, KCS Complexity,  
Communication Complex-  
ity. Probabilistic Analysis  
of Algorithms.

### PHYSICS

Classical Mechanics, Ther-  
modynamics, Electromag-  
netism, Special Relativity.

## CONFERENCE & SEMINAR TALKS

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### TECHNICAL SKILLS

#### PROGRAMMING LANGUAGES

C  
OCaml  
Java  
Python  
MATLAB  
Assembly

#### SCRIPTING AND WEB

HTML5  
CSS3  
Bash  
L<sup>A</sup>T<sub>E</sub>X

<b>MIX SEMINAR (ISTA)</b> <i>How to Throw a Great Party (and Solve Any Sliding Block Puzzle)</i> <i>A Linear Time Algorithm for Domino Tilings</i>	November 2023
<b>TOPOLOGY SEMINAR (UW-MILWAUKEE)</b> <i>Acute Triangulation of Constant Curvature Polygonal Complexes</i>	October 2022
<b>GEOMETRIC GROUP THEORY SEMINAR (MCGILL UNIVERSITY)</b> <i>Iterated medial subdivisions in spaces of constant curvature and acute triangulations of spherical and hyperbolic simplicial complexes.</i>	January 2020
<b>ILLUSTRATING MATHEMATICS (ICERM, BROWN UNIVERSITY)</b> Short talk as part of a semester long program on Illustrating Mathematics at the Institute for Computational and Experimental Mathematics (ICERM), Brown University.	Fall 2019
<b>YOUNG GEOMETRIC GROUP THEORY (YGGT)</b> Lighting talk presentation at the Young Geometric Group Theory Conference in Bilbao, Spain.	Summer 2019
<b>MCGILL MATHEMATICS AND STATISTICS GRADUATE STUDENT SEMINAR</b> Aperiodic Tilings & Undecidability, Penrose Tilings.	Winter 2019
<b>SEMINARS IN UNDERGRADUATE MATHEMATICS IN MONTREAL (SUMM)</b> Competitive inter-university conference, selected to give a presentation on Aperiodic Tilings and Undecidability.	Winter 2019
<b>GEOMETRIC GROUP THEORY SEMINAR(MCGILL UNIVERSITY)</b> Non-obtuse dissection of tetrahedra and my own resolution of the Hadwiger conjecture in dimension 3.	Fall 2018
<b>OPEN HOUSE OF THE MCGILL MATHEMATICS DEPARTMENT</b> Selected by the department of mathematics to give a talk to prospective students.	Fall 2018
<b>UNDERGRADUATE RESEARCH CONFERENCE AND POSTER SESSION</b> Nominated in the 5 best talks in the category "Mathematical Sciences" and selected to participate in the faculty wide poster session at McGill University.	Summer 2018

## TEACHING EXPERIENCE

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<b>CO-INSTRUCTOR</b> 2 week course intended for PhD Students. <i>Proving as a computational procedure and the limits of computation.</i>	Winter 2022
<b>TEACHING ASSISTANT (THEORY OF COMPUTATION)</b> Teaching assistant for the undergraduate class on the theory of computation (COMP 330), two units.	Winter 2021
<b>TEACHING ASSISTANT (ALGEBRAIC TOPOLOGY)</b> Teaching assistant for the first graduate algebraic topology class at McGill (MATH 576).	Fall 2020
<b>TEACHING ASSISTANT (ALGORITHM DESIGN)</b> Teaching assistant for the second undergraduate class on Algorithm Design (COMP 251).	Fall 2019
<b>TEACHING ASSISTANT (THEORY OF COMPUTATION)</b> Teaching assistant for the undergraduate class on the theory of computation (COMP 330). Average student review grade of 4.8/5.	Winter 2018
<b>PRIVATE TUTOR</b> Private tutor for mathematics, computer science or music theory undergraduate classes.	2017 - Ongoing
<b>SUS PEER TUTOR</b> Tutor for the first course in Abstract Algebra at McGill - Science Undergraduate Society.	2016

## ACADEMIC EXPERIENCE, TRAVELS & CONFERENCES

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<b>JAPAN CONFERENCE ON DISCRETE AND COMPUTATIONAL GEOMETRY, GRAPHS, AND GAMES (JCDCG)</b>	September 2022
<b>COMPUTATION AND RECONFIGURATION IN LOW-DIMENSIONAL TOPOLOGICAL SPACES (DAGSTUHL SEMINAR)</b>	February 2022
<b>ILLUSTRATING MATHEMATICS GRADUATE SUMMER SCHOOL, PCMI/IAS</b>	July 2021
<b>CANADIAN DISCRETE AND ALGORITHMIC MATHEMATICS CONFERENCE (CANADAM)</b>	May 2021
<b>VISITING STUDENT (UNIVERSITY OF WATERLOO)</b> Conducted research for 4 months at the University of Waterloo, collaborating with Anna Lubiw.	Summer 2021
<b>YOUNG GEOMETRIC GROUP THEORY CONFERENCE (YGGT)</b> Week-long conference at St Jacut-de-la-Mer, France.	Winter 2020
<b>ASPECTS OF GEOMETRIC GROUP THEORY SUMMER SCHOOL</b> Two-week summer school at the Institut des Hautes Etudes Scientifiques (IHES) in Bures-sur-Yvette, France.	Summer 2019
<b>YOUNG GEOMETRIC GROUP THEORY CONFERENCE (YGGT)</b> Week-long conference at the University of the Basque Country in Bilbao, Spain.	Summer 2019

<b>SIMONS SEMESTER ON GEOMETRIC AND ANALYTIC GROUP THEORY</b>	<i>Summer 2019</i>
Two month summer school funded by the Simons Institute. The semester included research commitments and the publication of a report.	
<b>RESEARCH ASSISTANT</b>	<i>Winter 2019</i>
Research Assistant for Prof. Luc Devroye.	
<b>READING GROUP ON AUTOMATIC GROUPS</b>	<i>Winter 2019</i>
Weekly, semester-long reading group on Automatic Groups run by graduate students.	
<b>SEMINARS ON GEOMETRIC GROUP THEORY</b>	<i>2017-Ongoing</i>
Attended weekly seminars on Geometric Group Theory.	
<b>CONFERENCE ON GRAPHS, SURFACES AND CUBE COMPLEXES</b>	<i>Summer 2018</i>
Attended a week-long conference at the Mathematics Institute at the University of Warwick.	
<b>VISITING STUDENT (IMPAN)</b>	<i>Summer 2018</i>
Conducted research for a month at the Institute of Mathematics of the Polish Academy of Sciences (IMPAN) in Warsaw under the supervision of Piotr Przytycki.	
<b>INDEPENDENT STUDY ON KOLMOGOROV COMPLEXITY AND ALGORITHMIC INFORMATION THEORY (AIT)</b>	<i>2017</i>
Statistical Information Theory. Kolmogorov Complexity. Algorithmic Information Theory. Information theoretic incompleteness theorems (Chaitin). Under the supervision of Prof. Hamed Hatami.	
<b>READING GROUP ON COMMUNICATION COMPLEXITY</b>	<i>2017</i>
Participation in a semester-long reading group to survey lower bounds in communication complexity, organised by Prof. Hatami.	
<b>MJUM EDITOR IN CHIEF</b>	<i>2017-2018</i>
Editor in chief of the McGill Journal for Undergraduate Mathematics (MJUM). Responsible for the revival of the journal as well as the publication of various articles and illustrations both on the online blog and in the printed journal.	

## AWARDS

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<b>GRADUATE MOBILITY AWARD</b>	<i>Summer 2021</i>
Competitive Summer Scholarship offered by McGill University to conduct research at another university.	
<b>BLUE FELLOWSHIP</b>	<i>Summer 2020</i>
Competitive Summer Scholarship at McGill University. Dissertation Title: Teaching Mathematics Through Games and Puzzles.	
<b>SURA SCHOLARSHIP (SCIENCE UNDERGRADUATE RESEARCH AWARD)</b>	<i>2018</i>
Scholarship awarded based on academic merit to engage in 16 weeks of full-time research under the supervision of a McGill science professor. (Supervised by Piotr Przytycki).	
<b>JAMES MCGILL SCHOLARSHIP</b>	<i>2014</i>
Entrance Scholarship based on academic merit.	
<b>BOURSE AU MÉRITE</b>	<i>2011-2013</i>
Monthly bursary awarded for outstanding results at the French Baccalauréat.	