

# Maxence Mayrand

## Curriculum Vitae | February 2021

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## Employment

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**University of Toronto | Postdoctoral Fellow** 2019–present  
Department of Mathematics  
Geometric Structures Laboratory  
Supervisor: Prof. Marco Gualtieri

**University of Oxford | Lecturer in Pure Mathematics** 2018–2019  
Teaching position at Jesus College (part time).

## Education

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**University of Oxford | DPhil in Mathematics** 2015–2019  
Supervisor: Prof. Andrew Dancer

**McGill University | BSc Honours Mathematics** 2012–2015  
Mentor: Prof. Niky Kamran

## Research interests

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I am a pure mathematician studying geometric and algebraic structures arising from quantum field theories. A recurring theme in my research is the interaction between analysis and algebra emerging from the study of moduli spaces.

**Keywords.** Complex geometry; Kähler geometry; hyperkähler geometry; Riemannian geometry; geometric quantization; topological quantum field theories; moduli spaces; gauge theory (Higgs bundles, monopoles, Nahm’s equations, Yang–Mills equations); mirror symmetry; deformation theory; holomorphic Poisson geometry; Lie groupoids; Lie theory; integrable systems; moment maps; geometric invariant theory.

## Publications and preprints

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- [1] Mayrand, M., *Hyperkähler metrics near Lagrangian submanifolds and symplectic groupoids*. [arXiv:2011.09282](https://arxiv.org/abs/2011.09282) (2020)
- [2] Mayrand, M., *Stratified hyperkähler spaces and Nahm’s equations* (PhD thesis). [Oxford University Research Archive](https://ora.ox.ac.uk/objects/uuid:28b31100-4000-4900-9000-000000000000) (2019)
- [3] Mayrand, M., *Kempf–Ness type theorems and Nahm equations*. [Journal of Geometry and Physics](https://doi.org/10.1017/S0022278X19000138), **136** (2019), 138–155.

- [4] Mayrand, M., *Stratification of singular hyperkähler quotients*. [arXiv:1807.05992](#) (2018)
- [5] Mayrand, M., *Stratified hyperkähler spaces from semisimple Lie algebras*. [Transformation Groups](#) (2018).
- [6] Mayrand, M., *Particle motion in monopoles and geodesics on cones*. [Symmetry, Integrability and Geometry: Methods and Applications \(SIGMA\)](#), **10** (2014), 102, 17 pages.

## Teaching

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### University of Toronto

- Introduction to Combinatorics Fall 2020
- Concepts in Abstract Mathematics Winter 2020

### Jesus College, University of Oxford

- Group Theory Spring 2019
- Groups and Group Actions Winter and Spring 2019
- Linear Algebra II Winter 2019
- Topology Winter 2019
- Linear Algebra I Fall 2018
- Introduction to University Mathematics Fall 2018
- Introduction to Complex Numbers Fall 2018

### Mathematical Institute, University of Oxford

Tutor:

- Lie Algebras Spring 2017
- Lie Algebras Fall 2017

Teaching assistant:

- Commutative Algebra Winter 2018
- Representation Theory of Semisimple Lie Algebras Winter 2017
- Lie Algebras Fall 2016

### Mini-courses at the graduate level

- Symplectic Reduction and Geometric Invariant Theory Dec 2020  
2020 Canadian Mathematical Society Winter Meeting (3 hours)
- Nahm's Equations Oct 2019  
The Fields Institute (6 hours)
- Stratified Hyperkähler Spaces and Nahm's Equations Jul 2018  
The Fields Institute (6 hours)

## Selected talks

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1. *Hyperkähler metrics near Lagrangian submanifolds and symplectic groupoids* 22 Jan 2021  
Geometry and Topology Seminar  
University of Waterloo

2. *Hyperkähler metrics near Lagrangian submanifolds and symplectic groupoids* 11 Jan 2021  
Differential Geometry Research Seminar  
University of Hamburg
3. *Hyperkähler realizations of holomorphic Poisson surfaces* 11 Dec 2020  
Friday Fish Seminar  
Utrecht University
4. *Symplectic reduction along a submanifold and the Moore–Tachikawa TQFT* 3 Sep 2020  
Northeastern University  
Geometry, Physics, and Representation Theory Seminar
5. *Hyperkähler structures on holomorphic symplectic groupoids* 7 Jun 2020  
Workshop on Lie theory and integrable systems in symplectic and Poisson geometry
6. *Hyperkähler structures on symplectic realizations of holomorphic Poisson surfaces* 28 May 2020  
School on Geometry and Dynamics of Foliations  
CIRM
7. *Kempf–Ness type theorems and Nahm’s equations* 7 Dec 2019  
2019 Canadian Mathematical Society Winter Meeting  
Algebraic Geometry and Representation Theory  
Toronto, Canada
8. *Stratified hyperkähler spaces, GIT, and Nahm’s equations* 5 Dec 2019  
Boston College  
Geometry and Topology Seminar
9. *Symplectic reduction, GIT quotients, and Nahm’s equations* 21 Nov 2019  
McMaster University  
Geometry and Topology Seminar
10. *Singular hyperkähler reduction and geometric invariant theory* 11 Nov 2019  
University of Toronto  
Symplectic Geometry Seminar
11. *Symplectic reduction, GIT quotients, and Nahm’s equations* 11 Oct 2019  
CIRGET (Centre interuniversitaire de recherches en géométrie et topologie)  
Geometry and Topology Seminar
12. *Singular hyperkähler quotients* 16 May 2019  
University of Duisburg-Essen, Germany  
The Essen Seminar for Algebraic Geometry and Arithmetic
13. *Stratified hyperkähler spaces* 6 Feb 2019  
Centre for Quantum Geometry of Moduli Spaces, Aarhus, Denmark  
QGM seminars
14. *Hyperkähler quotients and geometric invariant theory* 5 Feb 2019  
Centre for Quantum Geometry of Moduli Spaces, Aarhus, Denmark  
Introductory seminars
15. *Stratified hyperkähler spaces* 15 Jun 2018  
University of Edinburgh  
GLEN Algebraic Geometry Seminar

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| 16. <i>Stratified hyperkähler spaces</i><br>University of Oxford<br>Geometry and Analysis Seminar  | 5 Mar 2018  |
| 17. <i>Nahm equations, stratified hyperkähler spaces and the Moore–Tachikawa category.</i><br>ICTS, Tata Institute of Fundamental Research, Bangalore, India<br>ICTS Special Seminar | 30 Mar 2017 |
| 18. <i>Nahm equations and stratified hyperkähler spaces</i><br>Indian Institute of Science, Bangalore, India<br>School and Workshop on Geometry and Physics of Moduli Spaces         | 28 Mar 2017 |

## Scholarships and awards

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### University of Toronto

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|---|-----------|
| • NSERC Postdoctoral Fellowship           | 2019–2021 |
| • FRQNT Postdoctoral research scholarship | 2019–2021 |

### Pacific Institute for the Mathematical Sciences

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| • PIMS Postdoctoral Fellowship (declined) | 2019–2021 |
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### University of Oxford

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| • Moussouris Scholarship<br>Full scholarship (tuition fees and living expenses)<br>Awarded by the University of Oxford | 2015–2019 |
| • NSERC CGS D (declined)<br>Alexander Graham Bell Canada Graduate Scholarships   | 2017–2019 |
| • NSERC PGS D<br>Postgraduate Scholarships–Doctoral Program  | 2017–2019 |
| • FRQNT doctoral scholarship (declined)  | 2017–2019 |
| • FRQNT master scholarship   | 2015–2017 |

### McGill University

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| • Dean’s Honour List                                | May 2015    |
| • First Class Honours in Mathematics                | May 2015    |
| • Gowrisankaran Prize in Mathematics and Statistics | May 2015    |
| • NSERC Undergraduate Student Research Award        | Summer 2014 |
| • Kamran Undergraduate Award                        | Summer 2013 |