

## Contact Information

- **Address:** Department of Pure Mathematics, University of Waterloo  
200 University Avenue West, Waterloo, Ontario, N2L 3G1, CANADA
  - **Telephone:** 1-519-888-4567 x32810
  - **Email:** karigiannis@uwaterloo.ca
  - **Website:** <http://www.math.uwaterloo.ca/~karigiannis>
- 

## Academic Positions

- **University of Waterloo**, Associate Professor, July 2013 – onwards
  - **University of Waterloo**, Assistant Professor, July 2008 – June 2013
  - **University of Oxford**, Marie Curie Incoming International Fellow, Aug 2007 – Dec 2008
  - **Mathematical Sciences Research Institute**, Postdoctoral Fellow, 2006 – 2007
  - **Michigan State University**, Visiting Research Instructor, 2005 – 2006
  - **McMaster University**, NSERC Postdoctoral Research Fellow, 2003 – 2005
- 

## Other Academic Affiliations

- **University of Western Ontario**, Adjunct Professor, Jul 2015 – Dec 2016
  - **Perimeter Institute for Theoretical Physics**, Affiliate Member, Mar 2011 – Dec 2022
- 

## Invited Short-Term Visits

- **Center of Mathematical Sciences and Applications, Harvard University**, Visitor, Sep – Dec, 2019
  - **Fields Institute**, Fields Research Fellow, Aug – Dec, 2017
  - **McGill University**, Visiting Professor, Jul – Dec, 2015
  - **Simons Center for Geometry and Physics**, Visitor, Aug 17 – Sep 6, 2014
  - **Hong Kong University**, Visiting Research Fellow, Dec 9 – Dec 30, 2012
  - **Columbia University**, Visiting Professor, Sep – Nov, 2012
  - **University of Cyprus**, Visitor, Feb 4 – Feb 8, 2008
  - **Institute of Mathematical Sciences, Chinese University of Hong Kong**, Visiting Scholar, May 2006
  - **Mathematical Sciences Research Institute**, Invited Member, Nov 2005
  - **Institute of Mathematical Sciences, Chinese University of Hong Kong**, Visiting Scholar, Oct 2004
- 

## Other Academic Employment

- **McGill University**. Course Instructor, Summer Session, Jul – Aug 2006 and Jul – Aug 2007
- 

## Academic Degrees

- **Harvard University**, Ph.D., June 2003, *Advisor: Professor Shing-Tung Yau*  
Thesis: *Deformations of  $G_2$  and Spin(7) Structures on Manifolds*
- **Harvard University**, A.M., *Mathematics*; June 1998
- **McGill University**, B.Sc., *Honours in Mathematics and Honours in Physics*; June 1997

**Research Grants**

- *NSERC Discovery Grant*: \$105,000; Apr 2019 – Mar 2024; “Geometric analysis of special structures in high dimensions inspired from physics; including singularities, torsion, and geometric evolution”.
- *NSERC Discovery Grant*: \$70,000; Apr 2014 – Mar 2019; “Exceptional geometric structures required for string theory and M-theory: moduli spaces and formation of singularities”.
- *NSERC Discovery Grant*: \$105,000; Apr 2009 – Mar 2014; “Differential geometry of manifolds with special holonomy and their calibrated submanifolds”.

**Research Interests**

- My area of research is differential geometry and geometric analysis. More specifically, I study manifolds with  $U(m)$ ,  $SU(m)$ ,  $G_2$ , or  $Spin(7)$  structures. This includes: the construction of torsion-free compact examples; the study of their moduli spaces and the extra geometric structures on such moduli spaces; conical singularities of such manifolds; calibrated submanifolds; Donaldson-Thomas connections in  $G_2$  and  $Spin(7)$  geometry; properties of special torsion classes; and geometric evolution equations in the context of special holonomy and calibrations.

**Research Publications and Preprints**

[Click here to view papers online](#)

- [23] S. Karigiannis, C. Lin, and J. Loftin; “Octonionic-algebraic structure and curvature of the Teichmüller space of  $G_2$  manifolds”; *in preparation*.
- [22] S. Dwivedi, P. Gianniotis, and S. Karigiannis; “Flows of  $G_2$ -structures, II: Curvature, torsion, symbols, and functionals”; *in preparation*.
- [21] X. de la Ossa, S. Karigiannis, and E. E. Svanes; “Geometry of general  $U(m)$ -structures: Kähler identities, the  $dd^c$  lemma, and Hodge theory”; *in preparation*.
- [20] T. A. Ivey and S. Karigiannis; “Twisted-Austere Submanifolds in Euclidean Space”; *submitted for publication*; 29 pages.
- [19] S. Karigiannis and J. Lotay; “Bryant–Salamon  $G_2$  manifolds and coassociative fibrations”; *submitted for publication*; 77 pages.
- [18] S. Karigiannis; “Introduction to  $G_2$  geometry”; *Lectures and Surveys on  $G_2$  manifolds and related topics* (Fields Institute Communications Volume 84), 3–50, (2020).
- [17] D. R. Cheng, S. Karigiannis, and J. Madnick; “Bubble tree convergence of conformally cross product preserving maps”; *Asian Journal of Mathematics*, to appear, 76 pages.
- [16] S. Dwivedi, P. Gianniotis, and S. Karigiannis; “A gradient flow of isometric  $G_2$ -structures”; *The Journal of Geometric Analysis*, published online (2019), print version to appear, 79 pages.
- [15] K. F. Chan, S. Karigiannis, and C. C. Tsang; “The  $\mathcal{L}_B$ -cohomology on compact torsion-free  $G_2$  manifolds and an application to ‘almost’ formality”; *Annals of Global Analysis and Geometry* **55**, 325–369 (2019).
- [14] K. F. Chan, S. Karigiannis, and C. C. Tsang; “Cohomologies on almost complex manifolds and the  $\partial\bar{\partial}$ -lemma”; *Asian Journal of Mathematics* **23**, 561–584 (2019).

- 
- [13] D. Joyce and S. Karigiannis; “A new construction of compact torsion-free  $G_2$  manifolds by gluing families of Eguchi–Hanson spaces”; *Journal of Differential Geometry*, to appear, 88 pages.
  - [12] S. Karigiannis and J. Lotay; “Deformation theory of  $G_2$  conifolds”; *Communications in Analysis and Geometry* **28**, 1057–1210 (2020).
  - [11] S. Karigiannis and C. H. Leung; “Deformations of calibrated subbundles of Euclidean spaces via twisting by special sections”; *Annals of Global Analysis and Geometry* **42**, 371–389 (2012).
  - [10] S. Karigiannis, B. McKay, and M.-P. Tsui; “Soliton solutions for the Laplacian coflow of some  $G_2$ -structures with symmetry”; *Differential Geometry and its Applications* **30**, 318–333 (2012).
  - [9] S. Karigiannis; “What is a  $G_2$ -manifold?”; *Notices of the American Mathematical Society* **58**, 580–581 (2011).
  - [8] S. Karigiannis; “Desingularization of  $G_2$  manifolds with isolated conical singularities”; *Geometry and Topology* **13**, 1583–1655 (2009).
  - [7] S. Karigiannis; “Flows of Spin(7)-structures”; *Proceedings of the 10th International Conference on Differential Geometry and its Applications: DGA 2007*; World Scientific Publishing, 263–277 (2008).
  - [6] S. Karigiannis and N. C. Leung; “Hodge theory for  $G_2$  manifolds: Intermediate Jacobians and Abel-Jacobi maps”; *Proceedings of the London Mathematical Society (3)* **99**, 297–325 (2009).
  - [5] S. Karigiannis; “Flows of  $G_2$ -structures, I.”; *Quarterly Journal of Mathematics* **60**, 487–522 (2009).
  - [4] S. Karigiannis; “Some Notes on  $G_2$  and Spin(7) Geometry”; *Recent Advances in Geometric Analysis; Advanced Lectures in Mathematics*, Vol. 11; International Press, (2010), 129–146.
  - [3] S. Karigiannis and M. Min-Oo; “Calibrated sub-bundles in noncompact manifolds with special holonomy”; *Annals of Global Analysis and Geometry* **28**, 371–394 (2005).
  - [2] M. Ionel, S. Karigiannis, and M. Min-Oo; “Bundle constructions of calibrated submanifolds in  $\mathbb{R}^7$  and  $\mathbb{R}^8$ ”; *Mathematical Research Letters* **12**, 493–512 (2005).
  - [1] S. Karigiannis; “Deformations of  $G_2$  and Spin(7) structures”; *Canadian Journal of Mathematics* **57**, 1012–1055 (2005).
- 

## Books

- [1] S. Karigiannis, N.C. Leung, and J.D. Lotay (editors); **Lectures and Surveys on  $G_2$ -manifolds and Related Topics** (*Fields Institute Communications Volume 84*); Springer Nature; 2020.
- 

## Training of Highly Qualified Personnel

[Click here for more details on students](#)

### PDF (Postdoctoral Fellows) – most jointly supervised within the Waterloo Geometry & Topology group

- [12] Da Rong (Daren) Cheng (PhD Stanford University); 2020–2022
- [11] Andrew Staal (PhD Queen’s University); 2019–2021
- [10] Ali Aleyasin (PhD Stony Brook); 2017–2019; (*currently transitioning to industry career*)
- [9] Michael Bailey (PhD Toronto); 2017–2018; (*currently transitioning to industry career*)
- [8] Panagiotis Gianniotis (PhD Stony Brook); 2016–2017; Fields-Ontario Postdoctoral Fellow, **sole-supervised** (*currently tenure-track professor at University of Athens*)

- [7] Ákos Nagy (PhD Michigan State); 2016–2017; (*currently Postdoc at Duke University*)
- [6] Steven Gindi (PhD Stony Brook); 2014–2016; (*currently Postdoc at Binghamton University*)
- [5] Reza Seyyedali (PhD Johns Hopkins); 2012–2015; (*at Institute for Research in Fundamental Sciences*)
- [4] Yunxia Chen (PhD Chinese U of Hong Kong); 2013; (*became Postdoc at Max Planck Institute, Bonn*)
- [3] Aaron Smith (PhD U Pennsylvania); 2011–2013; (*became Researcher at Leap Motion, Inc.*)
- [2] Ken Chan (PhD Stanford); 2010–2012; (*went to work in the financial industry*)
- [1] Shengda Hu (PhD UW Madison); 2009–2011; (*now Associate Professor, Wilfrid Laurier University*)

### PhD (Doctor of Philosophy) students<sup>1</sup>

- [5] Anton Iliashenko; 2020/09/01–2024/08/31 (*expected*)
- [4] Ragini Singhal<sup>4</sup>; 2017/09/01–2021/08/31 (*expected*)
- [3] Shubham Dwivedi; 2015/09/01–2020/04/30 (*currently a postdoc at Humbolt and Michigan State*)
- [2] Jonathan Herman<sup>3</sup>; 2014/09/01–2018/06/30; (*currently developing math apps for mobile platforms*)
- [1] Josue Rosario-Ortega<sup>2</sup>; 2012/09/01–2016/08/31; (*currently working in industry: operations research*)

<sup>1</sup> granted ADDS (*Approved Doctoral Dissertation Supervisor*) status by University of Waterloo in 2013

<sup>2</sup> PhD student at the University of Western Ontario, co-supervised with Tatyana Barron

<sup>3</sup> co-supervised with Shengda Hu (Wilfrid Laurier University).

<sup>4</sup> co-supervised with Benoit Charbonneau.

### MMath (Master of Mathematics) students – (THESIS) indicates MMath thesis option

- [10] Caleb Suan; 2020/01/01–2020/12/31 (THESIS) (*expected*)
- [9] Anton Iliashenko; 2019/09/01–2020/08/31 (*expected*)
- [8] Anthony McCormick; 2016/09/01–2017/08/31 (THESIS)
- [7] Rui Philip Xiao<sup>2</sup>; 2014/01/01–2015/04/30 (THESIS)
- [6] Jonathan Herman; 2013/09/01–2014/08/31
- [5] Janis Lazovskis<sup>1</sup>; 2013/09/01–2014/08/31
- [4] David Pazmino-Pullas; 2012/09/01–2013/08/31
- [3] Adam Bognat; 2010/09/01–2011/12/31
- [2] Chun Ho Nat Leung; 2010/09/01–2011/08/31 (THESIS)
- [1] Thea Gegenberg; 2009/09/01–2010/12/31

<sup>1</sup> co-supervised with Benoit Charbonneau.

<sup>2</sup> co-supervised with Ken Davidson.

### Undergraduate student research assistants – (NSERC) indicates NSERC USRA student

- [15] Ying Kit Marco Hui; 2020/06/15–2020/08/31
- [14] Shun Zhang; 2020/05/01–2020/08/31
- [13] Anton Iliashenko<sup>2</sup>; 2019/05/01–2019/08/31 (NSERC)

- [12] Ki Fung Lemon Chan; 2017/05/15–2017/08/15
- [11] Chi Cheuk Jason Tsang; 2017/05/01–2017/08/15
- [10] Anthony McCormick; 2016/05/01–2016/08/31 (NSERC)
- [9] Xinle Clair Dai<sup>1</sup>; 2016/01/01–2016/04/30
- [8] Ningyuan Wang; 2014/06/01–2014/08/10
- [7] Justin Shaw; 2014/05/01–2014/08/31 (NSERC)
- [6] Saifuddin Syed; 2013/05/01–2013/08/31 (NSERC)
- [5] Li Chen; 2012/05/01–2012/08/31 (NSERC)
- [4] Li Chen; 2011/05/01–2011/08/31 (NSERC)
- [3] Zachary Drudi; 2010/05/01–2010/08/31 (NSERC)
- [2] Ho Yeung Hung; 2009/05/15–2009/08/30
- [1] Chun Ho Nat Leung; 2009/05/15 –2009/08/30

<sup>1</sup> co-supervised with Shengda Hu (Wilfrid Laurier University).

<sup>2</sup> co-supervised with Shubham Dwivedi.

---

## Teaching Experience      [Click here to see course materials](#)

### University of Waterloo; 2016–onwards

- [56] PMATH 868: *Connections and Riemannian Geometry*; Winter 2021
- [55] PMATH 945: *Topics in Algebra: Clifford Algebras, Spinors, and Calibrations*; Fall 2020
- [54] PMATH 465: *Smooth Manifolds*; Fall 2020
- [53] PMATH 365: *Differential Geometry*; Winter 2020
- [52] PMATH 352: *Complex Analysis*; Winter 2020
- [51] PMATH 365: *Differential Geometry*; Winter 2019
- [50] PMATH 965: *Topic in Geometry and Topology: Special Riemannian Structures*; Winter 2019
- [49] PMATH 499: *Introduction to Twistor Theory (Reading Course)*; Fall 2018
- [48] MATH 237: *Calculus 3 (Honours Math)*; **Course Coordinator**; Spring 2018
- [47] MATH 245: *Linear Algebra 2 (Advanced Level)*; Spring 2018
- [46] MATH 237: *Calculus 3 (Honours Math)*; **Course Coordinator**; Winter 2018
- [45] MATH 247: *Calculus 3 (Advanced Level)*; Winter 2018
- [44] PMATH 950: *Topics in Analysis: Differential Analysis*; Winter 2017
- [43] PMATH 690: *Kähler Geometry (Reading Course)*; Fall 2016
- [42] PMATH 465/665: *Geometry of Manifolds*; Fall 2016
- [41] MATH 237: *Calculus 3 (Honours Math)*; Fall 2016
- [40] PMATH 332 / AMATH 332: *Applied Complex Analysis*; Winter 2016
- [39] MATH 247: *Calculus 3 (Advanced Level)*; Winter 2016

**McGill University; 2015**

- [38] MATH 706: *Advanced Topics in Geometry and Topology I:  $G_2$  manifolds*; Fall 2015

**University of Waterloo; 2013–2015**

- [37] PMATH 763: *Introduction to Lie Groups and Lie Algebras*; Winter 2015  
[36] MATH 247: *Calculus 3 (Advanced Level)*; Winter 2015  
[35] PMATH 955: *Topics in Geometry: The Atiyah–Singer Index Theorem*; Winter 2014  
[34] PMATH 465/665: *Riemannian Geometry*; Fall 2013  
[33] PMATH 499: *Kähler Geometry (Reading Course)*; Spring 2013  
[32] PMATH 365: *Smooth Manifolds*; Winter 2013  
[31] MATH 146: *Linear Algebra 1 (Advanced Level)*; Winter 2013

**Columbia University; 2012**

- [30] MATH G6273: *Special holonomy and calibrations*; Fall 2012

**University of Waterloo; 2009–2012**

- [29] PMATH 900: *Topics in Algebra: Special Algebraic Structures*; Winter 2012  
[28] MATH 146: *Linear Algebra 1 (Advanced Level)*; Winter 2012  
[27] MATH 237: *Calculus 3 (Honours Math)*; Fall 2011  
[26] PMATH 499: *Variational Methods in Riemannian Geometry (Reading Course)*; Spring 2011  
[25] PMATH 955: *Topics in Geometry: Complex and Kähler Manifolds*; Winter 2011  
[24] PMATH 365 / AMATH 333: *Elementary Differential Geometry*; Winter 2011  
[23] PMATH 465 / AMATH 433 / PMATH 665: *Differential Geometry*; Winter 2010  
[22] PMATH 690: *Smooth Methods in Algebraic Topology (Reading Course)*; Fall 2009  
[21] MATH 247: *Calculus 3 (Advanced Level)*; Fall 2009  
[20] MATH 235: *Linear Algebra 2 (Honours Math)*; Fall 2009  
[19] PMATH 365 / AMATH 333: *Elementary Differential Geometry*; Winter 2009

**McGill University; 2006–2007**

- [18] MATH 348: *Topics in Geometry*; Summer 2007  
[17] MATH 348: *Topics in Geometry*; Summer 2006

**Michigan State University; 2005–2006**

- [16] Math 432-2: *Axiomatic Geometry*; Spring 2006
- [15] Math 132-1: *Calculus I*; Spring 2006
- [14] Math 132-19: *Calculus I*; Fall 2005
- [13] Math 132-2: *Calculus I*; Fall 2005

### McMaster University; 2003–2005

- [12] Math 764: *Holonomy and Calibrations*; Winter 2005
- [11] Math 2Q04: *Advanced Calculus for Engineering*; Winter 2004

### Harvard University; 1997–2003

- [10] Math 21b: *Linear Algebra and Differential Equations*; Spring 2003
- [9] Tutorial: *Quantum Mechanics for the Masses and the Massless*; Spring 2003
- [8] Math 21a: *Multivariable Calculus (Physics Section)*; Fall 2002
- [7] Math 21a: *Multivariable Calculus (Regular Section)*; Spring 2002
- [6] Math 21a: *Multivariable Calculus (Physics Section)*; Spring 2002
- [5] Math 21b: *Linear Algebra and Differential Equations*; Fall 2001
- [4] Math 21a: *Multivariable Calculus (Physics Section)*; Fall 2000
- [3] Tutorial: *Geometry of Spacetime*; Summer 2000
- [2] Tutorial: *Geometry and Gauge Theory*; Spring 2000
- [1] Math 21a: *Multivariable Calculus (Physics Section)*; Fall 1999

---

### Academic Service

#### Editorial Boards

- Editor, *Pure and Applied Mathematics Quarterly* (International Press); 2019–onwards

#### Conference, Workshop, and Special Program Co-Organization

- *Workshop on Special Geometries on Riemannian Manifolds*; Université du Québec à Montréal; 17/05/2021–21/05/2021; (with V. Apostolov, I. Agricola, R. Bryant, and M. Wang)
- *G<sub>2</sub> Geometry and Related Topics*; Casa Matemática Oaxaca; 05/05/2019–10/05/2019; (with N.C. Leung and J. Lotay)
- *Fields Institute Geometric Analysis Colloquium, 2019–2020*; 7/2017–4/2018; (with S. Alexakis, R. Haslhofer, S. Lu, Y. Liokumovich, and M. Wang)
- *Fields Institute Geometric Analysis Colloquium, 2018–2019*; 7/2017–4/2018; (with S. Alexakis, W. Craig, R. Haslhofer, and M. Wang)
- Special Session, CMS Winter Meeting: *Geometric Analysis*; University of Waterloo, 08/12/2017–11/12/2017; (with B. Charbonneau)
- *GAP 2017: Curvature Flows in Complex Geometry*; Fields Institute for Research in Mathematical Sciences; 04/12/2017–06/12/2017; (with M. Gualtieri, R. Moraru, and M. Wang)

- *Fields Institute “Workshop on  $G_2$ -manifolds”*; 21/08/2017–25/08/2017; (with N.C. Leung and J. Lotay)
- *Fields Institute “Minischool on  $G_2$ -manifolds”*; 19/08/2017–20/08/2017; (with N.C. Leung and J. Lotay)
- *Fields Institute Major Six Month Thematic Program on Geometric Analysis*; 07/2017–12/2017; (with S. Alexakis, W. Craig, R. Haslhofer, A. Naber, and M. Wang)
- *Fields Institute Geometric Analysis Colloquium, 2017–2018*; 7/2017–4/2018; (with S. Alexakis, W. Craig, R. Haslhofer, and M. Wang)
- *Fields Institute Geometric Analysis Colloquium, 2016–2017*; 9/2016, 11/2016, 3/2017, 3/2017; (with S. Alexakis, W. Craig, R. Haslhofer, and M. Wang)
- *Fields Institute Geometric Analysis Colloquium, 2015–2016*; 10/2015, 3/2016; (with S. Alexakis, W. Craig, R. Haslhofer, and M. Wang)
- Special Session, CMS Winter Meeting: *Differential Geometry*; McMaster University, 05/12/2014–08/12/2014; (with B. Charbonneau and M. Wang)
- *Fields Institute Geometric Analysis Colloquium, 2014–2015*; 10/2014, 5/2015; (with S. Alexakis, W. Craig, and M. Wang)
- Geometry and Physics: GAP 2014; Pacific Institute for the Mathematical Sciences; 29/05/2014–31/05/2014; (with C. Doran, M. Gualtieri, R. Moraru, T. Hübsch, and M. Wang)
- *Fields Institute Geometric Analysis Colloquium, 2013–2014*; 09/2013–04/2014; (with S. Alexakis, W. Craig, and M. Wang)
- Geometry and Physics: GAP 2013; Centre de Recherches Mathématiques; 30/05/2013–01/06/2013; (with M. Gualtieri, R. Moraru, J. Walcher, and M. Wang)
- Geometry and Physics: GAP 2012; University of Waterloo and Perimeter Institute for Theoretical Physics; 05/05/2012–07/05/2012; (with M. Gualtieri, R. Moraru, R. Myers, P. Vieira, and M. Wang)
- *Manifolds with Special Holonomy and their Calibrated Submanifolds and Connections*; Banff International Research Station; 29/04/2012–04/05/2012; (with B. Acharya, R. L. Bryant, and N.C. Leung)
- Special Session, CMS Winter Meeting: *Differential Geometry*; Ryerson University and York University, 10/12/2011–12/12/2011; (with B. Charbonneau)
- Geometry and Physics: GAP 2011; Fields Institute for Research in Mathematical Sciences; 13/05/2011–15/05/2011; (with M. Gualtieri, R. Moraru, R. Myers, and M. Wang)
- Geometry and Physics: GAP 2010; Perimeter Institute for Theoretical Physics; 07/05/2010–09/05/2010; (with J. Gomis, M. Gualtieri, R. Moraru, R. Myers, and M. Wang)
- Geometry and Physics: GAP 2009; Perimeter Institute for Theoretical Physics; 08/05/2009–10/05/2009; (with M. Gualtieri, R. Moraru, and M. Wang)
- *Special Structures in Riemannian Geometry*; Banff International Research Station; 17/02/2008–22/02/2008; (with G. Craig, N.C. Leung, M. Min-Oo, and S.-T. Yau)
- Special Session, CMS Winter Meeting: *Special Structures in Differential Geometry*; McGill University, 11/12/2004–13/12/2004; (with G. Craig)

#### Internal Service for the University of Waterloo

- *Colloquium Chair* for the Department of Pure Mathematics; 2020–2021
- Member of the *Student Awards Committee* for the Department of Pure Mathematics; 2019–2022
- Member of the *Graduate Admissions Subcommittee* for the Department of Pure Mathematics; 2018–2019
- Member of the *Senate Finance Committee* for the University; 2017–2019
- Member of the *Student Awards Committee* for the Department of Pure Mathematics; 2016–2018
- Member of the PhD Thesis Examination Chair pool; 2016–2018
- University Senate; *Faculty-at-Large Representative*; 2016–2019
- *Associate Chair of Graduate Studies* for the Department of Pure Mathematics; 2013–2015



- Member of the *Executive Committee* of the Department of Pure Mathematics; 2013–2015
- Member of the *Scholarship Committee* of the Department of Pure Mathematics; 2013–2014
- Member of *ad hoc subcommittee* for revision of the Geometry/Topology sequence of courses; 2011–2019
- Member of the *Pure Mathematics Chair Search Committee*; 2011
- *Colloquium Chair* for the Department of Pure Mathematics; Fall 2011
- Member of the *Math Faculty Graduate Studies Committee*; 2010–2015
- Member of the *Graduate Committee* of the Department of Pure Mathematics; 2009–2012

### Thesis Committee Memberships

- Jason d'Eon; *MMath Research Essay in Pure Mathematics*; 2019; second reader.
- Eric Boulter; *PhD in Pure Mathematics*; 2019–onwards; advisory committee member.
- Xiao-Bo Li; *PhD in Computer Science*; 2018; internal-external thesis defence examiner.
- David Svoboda; *PhD student in Physics/Perimeter*; 2016–2020; advisory committee member, and internal-external thesis defence examiner.
- Hanci Chi; *MMath Research Essay in Pure Mathematics*; 2015; second reader.
- Mikhail Panine; *PhD student in Applied Mathematics*; 2014–2017; advisory committee member; and internal-external thesis defence examiner.
- Jordan Hamilton; *PhD in Pure Mathematics*; 2014; member of thesis defence committee.
- Krishan Rajaratnam; *MMath Thesis in Applied Mathematics*; 2014; member of thesis defence committee.
- Jingyu Ma; *Master's thesis in mathematics at Wilfrid Laurier University*; 2013; external member of thesis defence examining committee.
- Tianheng Wang; *PhD student in Physics/Perimeter*; 2012–2014; advisory committee member (withdrew).
- João Caetano; *PhD student in Physics/Perimeter*; 2012–2015; advisory committee member; and internal-external thesis defence examiner.
- Nikita Nikolaev; *MMath Research Essay in Pure Mathematics*; 2011; second reader.
- Faisal Al-Faisal; *MMath Thesis in Pure Mathematics*; 2010; second reader.
- Mukto Akash; *MMath Research Essay in Pure Mathematics*; 2010; second reader.
- Matthew Stephen Calder; *PhD in Applied Mathematics*; 2009; internal-external thesis defence examiner.
- Benjamin Smith; *MMath Thesis in Pure Mathematics*; 2009; second reader.

### Other Service for the International Mathematical Community

- Member; ad-hoc Committee on the coordination of some Ontario mathematics/statistics graduate special topics courses by the Fields Institute; 2020–onwards
- Reviewer; Grant proposal for *National Science Centre, Poland*; 2020
- Research Output Evaluator; *Czech Academy of Sciences*; 2020
- Reviewer; *Banff International Research Station workshop proposal*; 2019
- Member of the Corporation; *Fields Institute for Research in Mathematical Sciences*; 2019–onwards
- Member of Preliminary Review Committee; *Shastri Indo-Canadian Institute*; 2018–onwards
- Reviewer; *NSERC Discovery Grant research proposal*; 2015
- Member of the *Electronic Services Committee* of the Canadian Mathematical Society; 01/2011–12/2013
- Invited panel reviewer; *National Science Foundation*; 2010
- Reviewer for a tenure case at *National Taiwan University*
- Reviewer for *Mathematical Reviews*; I have written over 88 reviews since 2003
- **Refereeing.** I have refereed submitted articles for the following journals (several on multiple occasions):
  - *Advances in Mathematics*

- *Annali della Scuola Normale di Pisa - Classe di Scienze*
- *Annals of Global Analysis and Geometry*
- *Asian Journal of Mathematics*
- *Bulletin of the London Mathematical Society*
- *Canadian Journal of Mathematics*
- *Communications in Analysis and Geometry*
- *Communications in Mathematical Physics (CMP)*
- *Differential Geometry and its Applications*
- *Duke Mathematical Journal*
- *Geometric and Functional Analysis (GAFA)*
- *Handbook of Geometric Analysis*
- *Inventiones Mathematicae*
- *Journal of the American Mathematical Society (JAMS)*
- *Journal of Combinatorial Designs*
- *Journal of Differential Geometry*
- *Journal of Geometric Analysis*
- *Journal of Geometry and Physics*
- *Journal of the London Mathematical Society*
- *Journal of Topology and Analysis*
- *Mathematical Research Letters*
- *Mathematische Annalen*
- *Mathematische Nachrichten*
- *Mathematische Zeitschrift*
- *New York Journal of Mathematics*
- *Pacific Journal of Mathematics*
- *Proceedings of the Strings-Math 2011 conference*
- *Progress in Mathematics*
- *Publicationes Mathematicae Debrecen*
- *Quarterly Journal of Mathematics*
- *SIGMA (Symmetry, Integrability and Geometry: Methods and Applications)*
- *Surveys in Differential Geometry*
- *Transactions of the American Mathematical Society*

#### Other Relevant Community Service

- Invited Panelist; [Virtual conference](#) of *STEMPOWER OTTAWA*; Aug 2020
- Coach; Mathematica Centrum competition; *Kitchener–Waterloo Bilingual School*; 2018–onwards
- Mentor; *Virtual Researcher On Call* program at St Mary’s Choir School in London, ON; Winter 2012

---

#### Invited Colloquium, Seminar, and Conference Talks

- [113] “Bryant–Salamon  $G_2$ -manifolds and coassociative fibrations”; *University of California at Irvine* (online); 10/11/2020
- [112] “Towards higher dimensional Gromov compactness in  $G_2$  and  $\text{Spin}(7)$  manifolds”; *Syracuse University* (online); 16/09/2020

- [111] “[Bryant–Salamon  \$G\_2\$ -manifolds and coassociative fibrations](#)”; Workshop on special geometries and gauge theory; *originally scheduled for Université de Bretagne Occidentale, moved to online*; 29/06/2020
- [110] “Towards higher dimensional Gromov compactness in  $G_2$  and  $\text{Spin}(7)$  manifolds”; *University of Waterloo* (online); 29/05/2020
- [109] “Conical singularities of  $G_2$ -manifolds in mathematics and physics”; *University of Michigan*; 21/02/2020
- [108] “Bryant–Salamon  $G_2$ -manifolds and coassociative fibrations”; *Michigan State University*; 20/02/2020
- [107] “Towards higher dimensional Gromov compactness in  $G_2$  and  $\text{Spin}(7)$  manifolds”; *University of Connecticut*; 09/12/2019
- [106] “Towards higher dimensional Gromov compactness in  $G_2$  and  $\text{Spin}(7)$  manifolds”; *Columbia University*; 06/12/2019
- [105] “Towards higher dimensional Gromov compactness in  $G_2$  and  $\text{Spin}(7)$  manifolds”; *Princeton University*; 04/12/2019
- [104] “Towards higher dimensional Gromov compactness in  $G_2$  and  $\text{Spin}(7)$  manifolds”; *McGill University*; 06/11/2019
- [103] “Cohomologies on almost complex manifolds and the  $\partial\bar{\partial}$ -lemma”; **Colloquium**; *Center of Mathematical Sciences and Applications, Harvard University*; 02/10/2019
- [102] “Constructions of compact torsion-free  $G_2$ -manifolds”; Members’ Seminar; *Center of Mathematical Sciences and Applications, Harvard University*; 06/09/2019
- [101] “A gradient flow of isometric  $G_2$ -structures”; A Celebration of Geometry, Analysis, and Physics: Conference honouring Niky Kamran on his 60th Birthday; *Centre de Recherches Mathématiques*; 14/06/2019
- [100] “A curious system of second order nonlinear PDEs for  $U(m)$ -structures on manifolds”; *Harvard University*; 08/04/2019
- [99] “A curious system of second order nonlinear PDEs for  $U(m)$ -structures on manifolds”; *University of Waterloo*; 05/04/2019
- [98] “A curious system of second order nonlinear PDEs for  $U(m)$ -structures on manifolds”; *McMaster University*; 15/11/2018
- [97] “Constructions of compact torsion-free  $G_2$ -manifolds”; *Columbia University*; 30/03/2018
- [96] “Cohomologies on almost complex manifolds and the  $\partial\bar{\partial}$ -lemma”; *City University of New York Graduate Center*; 29/03/2018
- [95] “Two simple ideas from calculus that are ubiquitous in geometric analysis”; **Prof Talk**, Pure Math, Applied Math, and Combinatorics & Optimization Club; *University of Waterloo*; 22/03/2018
- [94] “[Constructions of compact torsion-free  \$G\_2\$ -manifolds](#)”; 1st Canadian Geometry and Topology Seminar; *Fields Institute*; 16/03/2018
- [93] “[A new construction of compact  \$G\_2\$ -manifolds by gluing families of Eguchi–Hanson spaces](#)”; Workshop on  $G_2$ -manifolds; *Fields Institute*; 25/08/2017
- [92] “[Introduction to  \$G\_2\$  geometry, Part II.](#)”; Minischool on  $G_2$ -manifolds; *Fields Institute*; 19/08/2017
- [91] “[Introduction to  \$G\_2\$  geometry, Part I.](#)”; Minischool on  $G_2$ -manifolds; *Fields Institute*; 19/08/2017
- [90] “[Geometric Analysis: Fields 2017](#)”; Annual General Meeting; *Fields Institute*; 29/06/2017
- [89] “[Constructing compact  \$G\_2\$  manifolds by resolving  \$\(\text{Calabi–Yau 3-fold}\) \times S^1/\mathbb{Z}\_2\$](#) ”; Conference on ‘Constructions of compact exceptional holonomy spaces: past present and future’; *Imperial College London*; 05/06/2017

- [88] “Octonionic-algebraic structure and curvature of the moduli space of  $G_2$  manifolds”; Special Session on ‘ $G_2$  manifolds’; Sectional Meeting of the American Mathematical Society; *Stony Brook University*; 19/03/2016
- [87] “Partial classification of twisted austere 3-folds”; *Western University*; 26/01/2016
- [86] “Octonionic-algebraic structure and curvature of the moduli space of  $G_2$  manifolds”; Special Session on ‘Differential Geometry’; Winter Meeting of the Canadian Mathematical Society; *Montréal*; 5/12/2015
- [85] “Existence of  $G_2$  conifolds: a progress report”; Special Session on ‘Analysis on Singular Manifolds’; Winter Meeting of the Canadian Mathematical Society; *Montréal*; 5/12/2015
- [84] “Octonionic-algebraic structure and curvature of the moduli space of  $G_2$  manifolds”; *Université du Québec à Montréal*; 27/11/2015
- [83] “Octonionic-algebraic structure and curvature of the moduli space of  $G_2$  manifolds”; *Duke University*; 22/09/2015
- [82] “The geometry of  $G_2$  manifolds: a marriage of nonassociative algebra and nonlinear analysis”; **Colloquium**; *College of Charleston*; 18/09/2015
- [81] “ $G_2$  conifolds: A survey”; Workshop on ‘Special Geometric Structures in Mathematics and Physics’; *Universität Hamburg*; 12/09/2014
- [80] “Introduction to  $G_2$  geometry”; Workshop on ‘Special Geometric Structures in Mathematics and Physics’; *Universität Hamburg*; 11/09/2014
- [79] “[G<sub>2</sub> conifolds: desingularization, deformation, and construction?](#)”; Program on  $G_2$  manifolds; *Simons Center for Geometry and Physics*; 22/08/2014
- [78] “[Fundamentals of exceptional holonomy, II](#)”; Program on  $G_2$  manifolds; *Simons Center for Geometry and Physics*; 20/08/2014
- [77] “[Fundamentals of exceptional holonomy, I](#)”; Program on  $G_2$  manifolds; *Simons Center for Geometry and Physics*; 19/08/2014
- [76] “Curvature of the  $G_2$  moduli space”;  **$G_2$  Days 2014**; *University College London*; 16/07/2014
- [75] “Centro-affine geometry and curvature of the moduli space of  $G_2$  metrics”; Special Session on ‘Symplectic geometry and special metrics’; Joint Congress among Italian and Spanish Mathematical Societies; *University of the Basque Country*; 01/07/2014
- [74] “An introduction to  $G_2$  manifolds and  $G_2$  conifolds”; **Colloquium**; *Western University*; 24/01/2014
- [73] “[The mathematics of  \$G\_2\$  conifolds for M-theory](#)”; Workshop on ‘Physics Around Mirror Symmetry’; *Perimeter Institute for Theoretical Physics*; 25/10/2013
- [72] “Moduli spaces of  $G_2$  manifolds and  $G_2$  conifolds”; Workshop on Moduli Spaces and their Invariants in Mathematical Physics; *Centre de Recherches Mathématiques*; 05/06/2013
- [71] “A survey of results about  $G_2$  conifolds”; *Harvard University*; 16/04/2013
- [70] “ $G_2$  manifolds and  $G_2$  conifolds”; *Hong Kong University*; 20/12/2012
- [69] “Centro-affine geometry and curvature of the moduli space of  $G_2$  metrics”; *City University on New York Graduate Center*; 20/11/2012
- [68] “ $G_2$  manifolds and  $G_2$  conifolds”; *University of Pennsylvania*; 15/11/2012
- [67] “Deforming  $G_2$  conifolds”; *Brown University*; 05/11/2012
- [66] “[A survey of results about  \$G\_2\$  conifolds](#)”; International Conference on Cycles, Calibrations, and Non-linear Partial Differential Equations Celebrating Blaine Lawson’s 70th Birthday; *Stony Brook University and Simons Center for Geometry and Physics*; 28/10/2012

- [65] “Deforming  $G_2$  conifolds”; *Rutgers University – New Brunswick*; 15/10/2012
- [64] “ $G_2$  manifolds and  $G_2$  conifolds”; **Colloquium**; *Rutgers University – Newark*; 26/09/2012
- [63] “Deforming  $G_2$  conifolds”; *Princeton University*; 21/09/2012
- [62] “The moduli space of asymptotically conical  $G_2$  manifolds”; Workshop on Geometric PDE; *Centre de Recherches Mathématiques*; 26/04/2012
- [61] “A new construction of compact  $G_2$  manifolds by glueing families of Eguchi–Hanson spaces”; *University of Toronto*; 17/12/2012
- [60] “The moduli space of asymptotically conical  $G_2$  manifolds”; Special Session on ‘Differential Geometry’; Winter Meeting of the Canadian Mathematical Society; *Toronto*; 11/12/2011
- [59] “A new construction of compact  $G_2$  manifolds by glueing families of Eguchi–Hanson spaces”; *McMaster University*; 24/11/2011
- [58] “A new construction of compact  $G_2$  manifolds by glueing families of Eguchi–Hanson spaces”; Special Session on ‘Geometry and Physics’; Summer Meeting of the Canadian Mathematical Society; *University of Alberta*; 04/06/2011
- [57] “A new construction of compact  $G_2$  manifolds by glueing families of Eguchi–Hanson spaces”; *Université du Québec à Montréal*; 20/04/2011
- [56] “Two simple ideas from calculus applied to Riemannian geometry”; *Case Western Reserve University*; 15/11/2010
- [55] “Flows of  $G_2$  structures”; *University of Toledo*; 12/11/2010
- [54] “Algèbre et Géométrie: Sphères et Espaces Projectifs”; Canadian Undergraduate Mathematics Conference (**Keynote Speaker**); *University of Waterloo*; 08/07/2010
- [53] “Curvature of the moduli space of  $G_2$  metrics”; *University of Toronto*; 05/03/2010
- [52] “Curvature of the moduli space of  $G_2$  metrics”; *University of Oxford*; 15/02/2010
- [51] “Two simple ideas from calculus applied to Riemannian geometry”; **Colloquium**; *Wilfrid Laurier University*; 22/01/2010
- [50] “Curvature of the moduli space of  $G_2$  metrics”; *Western University*; 21/09/2009
- [49] “An exceptional structure in 7-dimensional geometry”; **Colloquium**; *University of Toledo*; 03/09/2009
- [48] “Curvature of the moduli space of  $G_2$  metrics”; Special Session on ‘Differential Geometry’; CMS-SMM-2009: Second Joint Meeting of the Canadian Mathematical Society and the Sociedad Matemática Mexicana 2009; *University of British Columbia*; 14/08/2009
- [47] “Structure of the  $G_2$  Moduli Space”; *McMaster University*; 12/03/2009
- [46] “Introduction to  $G_2$  geometry, Part Two”; *University of Waterloo*; 06/02/2009
- [45] “Introduction to  $G_2$  geometry, Part One”; *University of Waterloo*; 23/01/2009
- [44] “Introduction to  $G_2$  geometry, Part Two”; *University of Oxford*; 13/11/2008
- [43] “Introduction to  $G_2$  geometry, Part One”; *University of Oxford*; 06/11/2008
- [42] “Conical Singularities in  $G_2$  manifolds”; Special Session on Geometric and Nonlinear Analysis; Second Canada-France Math Congress; *Université du Québec à Montréal*; 02-05/06/2008
- [41] “What are  $G_2$  manifolds?”; **Colloquium**; *University of Warwick*; 09/05/2008
- [40] “ $G_2$  manifolds with isolated conical singularities”; *University of Oxford*; 28/04/2008
- [39] “Flows of  $G_2$  structures”; Workshop on Geometric Evolution Equations; *Centre de Recherches Mathématiques*; 16/04/2008

- [38] “ $G_2$  manifolds with isolated conical singularities”; *Duke University*; 14/04/2008
- [37] “ $G_2$  manifolds with isolated conical singularities”; Special Session on ‘Differential Geometry and Global Analysis’; 60th British Mathematical Colloquium; *University of York*; 26/03/2008
- [36] “ $G_2$  manifolds with isolated conical singularities”; *Université du Québec à Montréal*; 29/02/2008
- [35] “ $G_2$  manifolds with isolated conical singularities”; *Harvard University*; 26/02/2008
- [34] “What is a  $G_2$  manifold?”; **Department Lecture**; *University of Cyprus*; 06/02/2008
- [33] “Structure of the  $G_2$  Moduli Space”; *University of Leeds*; 30/01/2008
- [32] “ $G_2$ ” manifolds: Exceptional geometric structures arising from exceptional algebra”; **Special Colloquium**; *University of Waterloo*; 25/01/2008
- [31] “Moduli spaces of calibrated cycles in  $G_2$  manifolds”; Workshop on Minimal Submanifolds and Related Topics; *Banff International Research Station*; 10/12/2007
- [30] “Structure of the  $G_2$  Moduli Space”; *Imperial College London*; 07/12/2007
- [29] “Structure of the  $G_2$  Moduli Space”; *University of Cambridge*; 28/11/2007
- [28] “Structure of the  $G_2$  Moduli Space”; *University of Edinburgh*; 14/11/2007
- [27] “How to minimize without knowing how to differentiate (in Riemannian Geometry)”; **Colloquium**; *University College Cork*; 01/11/2007
- [26] “Flows of  $G_2$  and  $\text{Spin}(7)$  structures”; *University College Cork*; 01/11/2007
- [25] “Flows of  $G_2$  and  $\text{Spin}(7)$  structures”; *University of Oxford*; 22/10/2007
- [24] “Geometric Flows on Manifolds with  $G_2$  or  $\text{Spin}(7)$ -structure”; 10th International Conference on Differential Geometry and Its Applications; *Palacky University, Czech Republic*; 30/08/2007
- [23] “Moduli Spaces and Functionals in  $G_2$ -Geometry”; Workshop on the Physics and Mathematics of  $G_2$  Compactifications; Michigan Center for Theoretical Physics, *University of Michigan*; 04/05/2007
- [22] “Geometric Flows on Manifolds with  $G_2$ -structure”; *Stanford University*; 25/04/2007
- [21] “Moduli Spaces and Functionals in  $G_2$ -Geometry”; *University of California at Los Angeles*; 23/04/2007
- [20] “Geometric Flows on Manifolds with  $G_2$ -structure”; *University of California at Irvine*; 27/02/2007
- [19] “Geometric Flows on Manifolds with  $G_2$ -structure”; *Mathematical Sciences Research Institute*; 06/02/2007
- [18] “The Hitchin Heat Flow in  $G_2$ -Geometry, continued”; *Mathematical Sciences Research Institute*; 30/11/2006
- [17] “The Hitchin Heat Flow in  $G_2$ -Geometry”; *Mathematical Sciences Research Institute*; 16/11/2006
- [16] “Introduction to  $G_2$ -geometry”; *Mathematical Sciences Research Institute*; 20/10/2006
- [15] “Calibrated Sub-bundles in Non-compact Manifolds of Special Holonomy”; Workshop in Geometry; Institute of Mathematical Sciences, *Chinese University of Hong Kong*; 29/05/2006
- [14] “Algebra and Spheres in Higher Dimensions”; **Enrichment Programme for Young Mathematics Talents**; *Chinese University of Hong Kong*; 27/05/2006
- [13] “Algebraic Structure of the Local Moduli Space of  $G_2$  Metrics”; Special Session on Riemannian Manifolds with Additional Structures, AMS Regional Meeting; *Florida International University*; 01/04/2006
- [12] “Calibrated Geometries and Special Holonomy”; **Colloquium**; *University of Toledo*; 17/03/2006
- [11] “Calibrated Sub-bundles in Non-compact Manifolds of Special Holonomy”; *Michigan State University*; 20/09/2005
- [10] “The Moduli Space of  $G_2$  Metrics”; *Michigan State University*; 23/03/2005

- [9] “The Moduli Space of  $G_2$  Metrics”; Workshop on Geometry and Topology; *University of Minnesota*; 19/03/2005
- [8] “The Moduli Space of  $G_2$  Metrics”; *Université du Québec à Montréal*; 11/03/2005
- [7] “Bundle Construction of Calibrated Submanifolds”; *Columbia University*; 18/11/2004
- [6] “Special Lecture Series on  $G_2$ -Geometry”; Institute of Mathematical Sciences, *Chinese University of Hong Kong*; 12-29/11/2004
- [5] “New Examples of Coassociative Submanifolds”; Short Program in Riemannian Geometry; *Centre de recherches mathématiques*; 09/07/2004
- [4] “Deformations of  $G_2$  Structures on Manifolds”; *McMaster University*; 15/09/2003
- [3] “[Deformations of  \$G\_2\$  Structures on Manifolds](#)”; Von Neumann Symposium on Complex Geometry, Calibrations, and Special Holonomy; *Mathematical Sciences Research Institute*; 16/08/2003
- [2] “Deformations of  $G_2$  Structures on Manifolds”; Special Session on Nonlinear Partial Differential Equations in Differential Geometry, AMS Regional Meeting; *Courant Institute*; 13/04/2003
- [1] “Special Lagrangian Submanifolds in Mirror Symmetry”; *Université du Québec à Montréal*; 21/01/2000

---

**Awards and Academic Honours (including Teaching Awards)****University of Oxford**

- Marie Curie Incoming International Fellowship; 2007–2009

**Mathematical Sciences Research Institute**

- MSRI Postdoctoral Fellowship; 2006–2007

**McMaster University**

- NSERC PDF Postdoctoral Fellowship; 2003–2005

**Harvard University**

- Certificate of Distinction in Teaching; Spring 2003
- Certificate of Distinction in Teaching; Fall 2002
- Certificate of Distinction in Teaching; Fall 2000
- Bourse du Fonds FCAR; 2001–2002
- Certificate of Distinction in Teaching; Fall 1999
- NSERC PGS B Postgraduate Scholarship; 1999–2001
- Joseph Leonard Walsh Fellowship; 1998–1999
- James K. Whittemore Scholarship; 1997–1998
- NSERC PGS A Postgraduate Scholarship; 1997–1999

**McGill University**

- First Class Honours in Mathematics
- First Class Honours in Physics
- Dean’s Honour List; June 1997

- Moyse Travelling Scholarship; June 1997
  - Anne Molson Gold Medal; June 1997
  - Horace Watson Medal and Prize; June 1997
  - James F. Mathison Scholarship; 1996–1997
  - Sir Edward Beatty Memorial Scholarship; 1996–1997
  - H.J. Brennan Memorial Scholarship; 1995–1996
  - NSERC Undergraduate Student Research Award; Summer 1995
  - Hewlett-Packard Prize in Science; January 1995
  - E.P. Aikman Prize in Physics; June 1994
  - J.W. McConnell Entrance Scholarship; 1993–1997
  - Canada Scholarship in Science and Engineering; 1993–1997
-