

# RAGINI SINGHAL

## Curriculum Vitae

Department of Pure Mathematics  
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## Education

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| 2017-present | Ph.D. in Mathematics, <b>University of Waterloo</b> , Waterloo, Canada.<br>Advisors - <a href="#">Benoit Charbonneau</a><br><a href="#">Spiro Karigiannis</a><br>Expected Completion - April 2021                             |
| 2015-2016    | M.Sc. in Pure Mathematics, <b>Imperial College London</b> , UK.<br>M.Sc. Thesis - Stable minimal cones in Euclidean space.<br>M.Sc. Thesis Advisor - <a href="#">André Arroja Neves</a>                                       |
| 2011-2015    | BS in Mathematics, <b>Indian Institute of Technology, Kanpur</b> , India.<br>Undergraduate Thesis - Application of knot theory to detect chirality of molecules.<br>Undergraduate Thesis Advisor - <a href="#">Aparna Dar</a> |

## Research Interests

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Riemannian geometry, Geometric analysis, Gauge theory, Deformation theory, Metrics with special holonomy.

## Invited Short-Term Visits

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| May-June 2014 | Summer Research Visitor, <b>Simon Fraser University, Canada</b>  |
| May-July 2013 | Fellow, Student Research Fellowship Program 2013,<br><b>Indian Statistical Institute, New Delhi, India</b> |

## Preprints

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- (2) R. Singhal, *Deformations of  $G_2$  instantons on nearly  $G_2$  manifolds*, [arXiv:2101.02151](#).
- (1) S. Dwivedi and R. Singhal, *Deformation theory of nearly  $G_2$  manifolds, to appear in Communications in Analysis and Geometry*, [arXiv:2007.02497](#).

## Invited Talks

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- "Deformation of instantons on nearly  $G_2$  manifolds", AMS Fall Eastern Virtual Sectional meeting, 2020.
- "Deformation of instantons on nearly  $G_2$  manifolds", Ottawa Mathematic Conference 2020, Ottawa.
- "Deformation theory of nearly  $G_2$  manifolds", KCL/UCL Junior Geometry Seminar, 2020.
- "Deformation of instantons on nearly  $G_2$  manifolds" **IIT Kanpur, India**; 11/11/2019
- "[Deformations of  \$G\_2\$  instantons on nearly  \$G\_2\$  manifolds](#)",  $G_2$  geometry and related topics, **CMO-BIRS, Oaxaca, Mexico**; 07/05/2019
- "Minimal and Willmore surfaces", Graduate Student Colloquium, **University of Waterloo**, Canada; 26/03/2019

## Talks in Seminars

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- 2020 January - Talk on the deformation theory of nearly  $G_2$  manifolds, [Geometry Working Seminar](#), University of Waterloo.
- 2019 June - Series of talks on "Self-dual Yang–Mills connections on non-self-dual 4-manifolds", [Geometry Working Seminar](#), University of Waterloo.
- 2019 March - Series of talks on "Deformation of nearly  $G_2$  instantons", [Geometry Working Seminar](#), University of Waterloo.
- 2018 September - Stability and isolation phenomena for Yang–Mills fields, [Geometry Working Seminar](#), University of Waterloo
- 2018 April - Series of talks on " $SU(2)^2$  invariant  $G_2$  instantons", [Geometry Working Seminar](#), University of Waterloo.
- 2017 September - Stability of minimal cones in Euclidean space, [Geometry Working Seminar](#), University of Waterloo.

## Honours and Awards

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- 2019 Graduate Studies Research Travel, University of Waterloo, Canada
- 2017-present Graduate Research Scholarship, University of Waterloo, Waterloo, Canada
- 2017-present International Doctoral Student Award, University of Waterloo, Canada
- 2017-present Provost Doctoral Entrance Award for Women, University of Waterloo, Canada
- 2015-2016 Imperial India Foundation Scholarship, Imperial College London, UK
- 2013 Summer Research Fellowship, Indian Academy of Sciences/ Indian National Science Academy/National Academy of Sciences, India
- 2011-2015 Kishor Vaigyanik Protsahan Yojana (KVPY) scholarship, Indian Academy of Sciences, Government of India

## Teaching

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### Instructor & Coordinator

Spring 2020                      MATH 117 - Calculus I for Engineers

### Teaching Assistant

Fall 2020	PMATH 331 Applied Real Analysis MATH 127 Calculus 1 for the Sciences
Winter 2020	PMATH 450/650 Lebesgue integration and Fourier analysis MATH 235 Linear Algebra (tutorial center)
Fall 2019	PMATH 365/465 Differential geometry MMT 647 Foundations of Calculus I
Spring 2019	PMATH 321 Non Euclidean geometry PMATH 351 Real Analysis
Winter 2019	PMATH 333 Introduction to real analysis MATH 118 Calculus 2 for Engineering
Fall 2018	MATH 235 Linear Algebra PMATH 331 Applied real analysis
Spring 2018	MMT 648 Foundations of Calculus II
Winter 2018	PMATH 365/465 Differential geometry MATH 235 Linear Algebra
Fall 2017	PMATH 365/465 Differential geometry MATH 147 Calculus I (Advanced level)

## Conference and Workshop participation

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- Workshop on special geometries and gauge theory, originally scheduled for Universite de Bretagne Occidentale, France, 2020 (moved to online).
- CMS Winter meeting, Toronto, Canada; 2019.
- British Isles Graduate Workshop on Gauge theory in higher dimensions, Jersey, UK; 2019.
- Special Holonomy and Calibrated Geometry, Imperial College, London, UK; 2019
- Séminaire de Mathématiques Supérieures 2018: Derived Geometry and Higher Categorical Structures in Geometry and Physics, Fields Institute, Canada; 2018
- Geometry and Physics Conference, Fields Institute, Canada; 2017
- Workshop on Mean Curvature Flow and Ricci Flow, Fields Institute, Canada; 2017
- Minischool on Mean Curvature Flow and Ricci Flow, Fields Institute, Toronto, Canada; 2017
- Workshop on General Relativity & AdS/CFT, Fields Institute, Toronto, Canada; 2017
- Mini-School and Conference on  $G_2$  manifolds, Fields Institute, Toronto, Canada; 2017
- Summer School in Geometric Analysis, Fields Institute, Toronto, Canada; 2017
- RTG Workshop on the Geometry and Physics of Higgs Bundles II, November 11-12, University of Illinois at Chicago; 2017
- Conference in Differential Geometry, LeBrun Fest 2016, 5-9 July, Centre de Recherches Mathématiques, Canada; 2016
- Warwick Imperial Autumn Meeting, 28 November, University of Warwick, UK; 2015
- Conference in Geometry, Topology and Dynamics at DST-CIMS, Banaras Hindu University, India; 2014

## Services

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- Volunteer, Mathematica Centrum Contest tutor, [K-W Bilingual School](#), Waterloo.
- Judge, Science Fair, [K-W Bilingual School](#), Waterloo.
- Co-organizer, Pure Mathematics Graduate Student Colloquium, University of Waterloo.
- Graduate Volunteer, The Great Polytope Barn-Raising Project, University of Waterloo. Trained and coordinated undergraduate volunteers in building a model of a 4D-polytope.
- Grader, CEMC Math contest, University of Waterloo.

Last Updated : January 7, 2021