

RAGINI SINGHAL

Curriculum Vitae

Department of Mathematics
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Employment

Sep 2021-2023 Research Associate, **King's College London**
(funded by the [Simons Collaboration on Special Holonomy](#)).
Mentor - [Simon Salamon](#)

Education

2017-2021 Ph.D. in Mathematics, **University of Waterloo**, Waterloo, Canada.
Advisors - [Benoit Charbonneau](#)
[Spiro Karigiannis](#)

2015-2016 M.Sc. in Pure Mathematics, **Imperial College London**, UK.
M.Sc. Thesis - Stable minimal cones in Euclidean space.
M.Sc. Thesis Advisor - [André Arroja Neves](#)

2011-2015 BS in Mathematics, **Indian Institute of Technology**, Kanpur, India.
Undergraduate Thesis - Application of knot theory to detect chirality of molecules.
Undergraduate Thesis Advisor - [Aparna Dar](#)

Research Interests

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

Invited Short-Term Visits

May-June 2014 Summer Research Visitor, **Simon Fraser University**, Canada

May-July 2013 Fellow, Student Research Fellowship Program 2013,
Indian Statistical Institute, New Delhi, India

Preprints

- (2) R. Singhal, *Deformations of G_2 instantons on nearly G_2 manifolds*, submitted, preprint available on [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

- "Deformations of G_2 instantons on nearly G_2 manifolds", UCL geometry seminar, February 16 2022, UCL.
- "Deformations of G_2 instantons on nearly G_2 manifolds", Simons collaboration workshop "Connections between String Theory and Special Holonomy", January 10-14 2022, Oxford.

- "Deformation theory of nearly G_2 manifolds", Differential Geometry Seminar 2020-2021, UC Santa Barbara.
- "Deformation of instantons on nearly G_2 manifolds", AMS Fall Eastern Virtual Sectional meeting, 2020.
- "Deformation of instantons on nearly G_2 manifolds", Ottawa Mathematics 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

- 2021 February - Talk on six dimensional nearly Kähler manifolds of cohomogeneity one, Geometry Working Seminar, University of Waterloo.
- 2021 January - Talk on new G_2 -holonomy cones and exotic nearly Kähler structures on S^6 and $S^3 \times S^3$, Geometry Working Seminar, University of Waterloo.
- 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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| • 2021 | Doctoral Thesis Completion Award, University of Waterloo, Canada |
| • 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

Instructor & Coordinator

Spring 2020 MATH 117 - Calculus I for Engineers

Teaching Assistant

Winter 2021	PMATH 450/650 Lebesgue integration and Fourier analysis
	PMATH 365/465 Differential geometry
Fall 2020	PMATH 331 Applied Real Analysis
	MATH 127 Calculus 1 for the Sciences
Winter 2020	PMATH 450/650 Lebesgue integration and Fourier analysis

Fall 2019	MATH 235 Linear Algebra (tutorial center) PMATH 365/465 Differential geometry
Spring 2019	MMT 647 Foundations of Calculus I 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

- 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

- Organizer, Junior Special Geometers Meeting, King's College London, 6-8 January 2022.
- 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.