

# RAGINI SINGHAL

Curriculum Vitae

September 20, 2025

Email : [raginisinghal1016@gmail.com](mailto:raginisinghal1016@gmail.com)/ [rsinghal@uni-muenster.de](mailto:rsinghal@uni-muenster.de)

Webpage : [raginisinghalmath.github.io](https://raginisinghalmath.github.io)

## Employment

---

- |                 |  |
|-----------------|--|
| Oct 2024-2027   | Postdoctoral researcher, <b>University of Münster</b><br>Mentor - <a href="#">Hans-Joachim Hein</a>  |
| Sep 2023-2024   | Research associate, <b>Université Libre de Bruxelles</b><br>Mentor - <a href="#">Joel Fine</a>   |
| March-July 2023 | Visiting researcher, <b>Humboldt-Universität zu Berlin</b><br>Mentor - <a href="#">Thomas Walpuski</a>   |
| Nov 2021-2022   | Research Associate, <b>King's College London</b><br>(funded by the <a href="#">Simons Collaboration on Special Holonomy</a> ).<br>Mentor - <a href="#">Simon Salamon</a> |

## Education

---

- |           |   |
|-----------|---|
| 2017-2021 | Ph.D. in Mathematics, <b>University of Waterloo</b> , Waterloo, Canada.<br>Advisors - <a href="#">Benoit Charbonneau</a><br><a href="#">Spiro Karigiannis</a>   |
| 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

---

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

## Preprints

---

- (1) D. Festi, D. Platt, R. Singhal, Y. Tanaka, Examples of real stable bundles on K3 surfaces [arXiv](#)

## Publications

---

- (4) Salamon, S., Singhal, R., Revisiting 3-Sasakian and  $G_2$ -structures, Ornea, L. (eds) **Real and Complex Geometry . Springer, Cham.** (2025) [arXiv Journal](#)
- (3) R. Singhal, *Nearly half-flat structures on  $S^3 \times S^3$* , **Differential Geometry and its Applications** **97** [arXiv:2310.11233](#), [Journal](#).

- (2) R. Singhal, *Deformations of  $G_2$  instantons on nearly  $G_2$  manifolds*, **Annals of Global Analysis and Geometry** 62, pages 329–366 (2022) [arXiv:2101.02151](#), [Journal](#).
- (1) S. Dwivedi and R. Singhal, *Deformation theory of nearly  $G_2$  manifolds*, **Communications in Analysis and Geometry** Volume 31 Number 3 2023, [arXiv:2007.02497](#), [Journal](#).

## In preparation articles

---

- (4) S. Salamon, R. Singhal,  *$SO(4)$ -invariant nearly parallel  $G_2$ -structures on Berger Space*.
- (3) B. Charbonneau, D. Harland, R. Singhal, *Higher order degormations of instantons on 6-dim Nearly Kähler and Nearly  $G_2$ -manifolds*.
- (2) J. Fine, P. Ghosh, R. Singhal, *Seiberg–Witten equations on  $Spin(7)$ -manifolds*
- (1) S. Dwivedi and R. Singhal, *Einstein metrics on  $Spin(7)$ -manifolds*.

## Invited Short-Term Visits

---

March-June 2024	CRM-Simons Research Visitor, <b>CRM, Montreal, Canada</b>
May-June 2014	Summer Research Visitor, <b>Simon Fraser University, Canada</b>
May-July 2013	Fellow, Student Research Fellowship Program 2013, <b>Indian Statistical Institute, New Delhi, India</b>

## Invited Talks

---

- "Cohomogeneity-one nearly  $G_2$ -structures" , Forschungsseminar über Differentialgeometrie, 6 January 2025, University of Hamburg, Germany.
- "Nearly half-flat structures on  $S^3 \times S^3$ ", Mathematisches Seminar, 17 December 2024, University of Kiel, Germany.
- "Deformation theory of nearly  $G_2$ -instantons" Geometric Models of Matter 2024, 21 August 2024, Leeds University, UK.
- "Cohomogeneity-one nearly  $G_2$ -structures" Special geometries in Dimension 6,7,8, 26th April 2024, CRM Montreal
- "Deformation theory of  $G_2$ -structures and instantons", Young Scholar day, 20 December 2023, Belgian Math Society.
- "Nearly half-flat structures on  $S^3 \times S^3$ ", Oberseminar, November 27, 2023, Universität Münster.
- "Deformation theory of nearly  $G_2$  manifolds", ULB Differential Geometry Seminar, May 2, 2023, Université Libre de Bruxelles.
- "Deformations of  $G_2$  instantons on nearly  $G_2$  manifolds", Oxford-London Gauge assembly, November 11, 2022 (online).
- "Deformations of  $G_2$  instantons on nearly  $G_2$  manifolds", Leeds geometry seminar, September 21 2022, University of Leeds.
- "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

---

- |                |   |
|----------------|---|
| • 2023         | CRM-Simons Scholar at Centre de Recherches Mathématiques, March-June 2024.  |
| • 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 2024	KG-2024 Kähler Geometry
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
	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

- Special Holonomy: Progress and Open Problems 2022, 11-14 Sep 2022, Simons Center, Stony Brook University. (Organizer: Robert Bryant)
- Sixth Annual Meeting, 8-9 Sep 2022, Simons Foundation, NY.
- Geometry, Topology and Singular Special Holonomy Spaces, 6-10 June 2022, Freiburg University (Freiburg, Germany).
- 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

## Services

- Referee, Journal of Differential Geometry (International press).
- Referee, Quarterly Journal of Mathematics (Oxford University Press).
- Organizer, Workshop: Special Riemannian metrics in dimensions 6,7,8, Centre de Recherches Mathématiques, Montreal, 22-26 April 2024.
- Organizer, British Isles Graduate Workshop, Inverness, 3-7 July 2023.
- 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.

## References

- Joel Fine, Université Libre de Bruxelles, ([joel.fine@ulb.be](mailto:joel.fine@ulb.be))
- Simon Salamon, King's College London, ([simon.salamon@kcl.ac.uk](mailto:simon.salamon@kcl.ac.uk))

- Derek Harland, University of Leeds, ([d.g.harland@leeds.ac.uk](mailto:d.g.harland@leeds.ac.uk))
- Benoit Charbonneau, University of Waterloo ([bcharbon@uwaterloo.ca](mailto:bcharbon@uwaterloo.ca))
- Spiro Karigiannis, University of Waterloo ([karigiannis@uwaterloo.ca](mailto:karigiannis@uwaterloo.ca))