

Luuk Verhoeven

Curriculum Vitae

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Timeline

- 2023–2024 **Outreach project leader**, *PUC of Science, Radboud University, Nijmegen*, (0.2 FTE)
Organised educational computer science activities such as a Python seminar for high school students at university and helped coordinate an extracurricular program for advanced high school students.
- 2019–2023 **Ph.D. in Mathematics**, *University of Western Ontario, London, Ontario*, Supervisor: *prof. Khalkhali*
- 2016–2019 **Master of Mathematics (mathematical physics specialization)**, *Radboud University, Nijmegen*, *Graduated Summa Cum Laude*
- 2013–2016 **Radboud FNWI Honours**, *Radboud University, Nijmegen*, *Grade: 9*
The Honours programme provides additional experience with scientific work. It consists of writing a project proposal in an interdisciplinary setting and an expanded Bachelor thesis.
- 2012–2016 **Bachelor of Physics**, *Radboud University, Nijmegen*, *Graduated Summa Cum Laude*
- 2012–2016 **Bachelor of Mathematics**, *Radboud University, Nijmegen*, *Graduated Summa Cum Laude*

Publications

- 2024 **Large N limit of fuzzy geometries coupled to fermions**, M. Khalkhali, N. Pagliaroli, & L. S. Verhoeven, preprint, arXiv:2405.05056
- 2023 **Riemannian embeddings in codimension one as unbounded KK -cycles**, W. D. van Suijlekom, & L. S. Verhoeven, *Annals of K-theory*, vol. 8 no. 4 pp. 645–668
- 2022 **From noncommutative geometry to random matrix theory**, H. Hessam, M. Khalkhali, N. Pagliaroli, & L. S. Verhoeven, *Journal of Physics A: Mathematical and Theoretical*, 55(41), 413002.
- 2022 **Immersions and the unbounded Kasparov product: embedding spheres into Euclidean space**, W. D. van Suijlekom, & L. S. Verhoeven, *Journal of Noncommutative Geometry* 16 (2022), no. 2, pp. 489–511.

Ph.D. thesis

- title *Geometry in spectral triples: immersions and fermionic fuzzy geometries*
- supervisor Dr. M. Khalkhali
- co-supervisor Dr. W.D. van Suijlekom
- description From a codimension one Riemannian immersion we construct a family of unbounded KK -cycles representing the shriek class of the immersion. We show how to recover the geometric information from the unbounded product using an asymptotic expansion. We also construct a Dirac ensemble of $(0, 1)$ -fuzzy geometries with a fermionic contribution in the action and show that this ensemble has a well defined large- N limit. We investigate the spectral density of these models in this large- N limit.

Conferences and selected talks

- Dec 2023 **Workshop on Operator Algebras: NCG**, *Fields Institute*, Toronto, Ontario, 30 minute presentation on spectral properties of fermionic Dirac ensembles.
- Aug 2023 **COSy**, London, Ontario, 30 minute presentation on fermionic Dirac ensembles (also at CMS Summer Meeting 2023).
- Jul 2023 **NCG Student Seminar**, Online, 60 minute presentation on spectral truncations and operator system spectral triples following [Connes, van Suijlekom, 2020].
- Jun 2023 **CMS Summer Meeting**, *NCG and Mathematical Physics session*, Ottawa, Ontario, 30 minute presentation on fermionic Dirac ensembles.
- May 2023 **NSeaG 2023**, *Hausdorff School of Mathematics*, Bonn, Germany, attended the workshop and lectures on, among others, Quantum Groups by Dr. Voigt and Quantum Metric Spaces by Dr. Latrémolière.
- Jan 2023 **Workshop Quantum Gravity and Random Geometry**, *Institut Henri Poincaré, Paris, France*, attended lectures on, among others, Lattice Gravity by Dr. Ambjorn and Quantum Groups by Dr. Girelli.
- Jun 2022 **Workshop on NCG, Free Probability and Random Matrices**, *Fields Institute*, London, Ontario and online
- Jun 2021 **CMS Summer Meeting**, *NCG and Mathematical Physics session*, Toronto, Ontario, 30 minute presentation on [van Suijlekom, V., 2022]

Additional experience

- 2022–2023 **Graduate Seminar Organization**, *University of Western Ontario*, London, Ontario
As a team of four graduate students we restarted the in-person graduate seminar of the mathematics department.
- 2021 Fall **Calculus Instructor**, *University of Western Ontario*, London, Ontario
As instructor I was responsible for preparing and delivering lectures to supplement online material, help manage the online homework environment (Mobius) and help write the exams.
- 2019–2023 **Teaching Assistant**, *University of Western Ontario*, London, Ontario
The TA duties consist primarily of running tutorial sessions and creating and grading exams or homework. In 2021 I was awarded the Graduate Student Teaching Award by the mathematics department.
- 2016–2018 **Instructor for NLT**, *Radboud University and SSgN*, Nijmegen
NLT is a initiative by several local high schools to teach advanced subjects such as robotics and statistics at the Radboud University. I provided lectures and assisted with tutorials and experiments.
- 2016–2017 **Computer Science Teacher**, *Stedelijke Scholengemeenschap Nijmegen (SSgN)*, Nijmegen
I taught Computer Science to the 5 HAVO, 5 VWO and 6 VWO classes, equivalent to grades 11, 12 in the American system.
- 2014–2018 **Teaching Assistant**, *Radboud University*, Nijmegen
As a teaching assistant at the Radboud University I was responsible for tutorials and grading for various courses.

Languages

Dutch	Native speaker	<i>Dutch is my native tongue.</i>
English	Near native	<i>I am completely comfortable in English.</i>
German	Reading: B2, writing and speaking: B1	<i>I can read most texts and hold very basic conversation.</i>