

Luuk Verhoeven

Curriculum Vitae

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Education

- 2019 – 2023 **Ph.D. Mathematics**, *University of Western Ontario*, Promotor: prof. Khalkhali
Titel: *Geometry in spectral triples: immersions and fermionic fuzzy geometries*
- 2016– 2019 **Master Mathematics (specialization: mathematical physics)**, *Radboud University*, With honours
- 2013 – 2016 **Radboud FNWI Honours programme**, *Radboud University*
The Honours programme consists of writing an interdisciplinary research proposal and a more extensive Bachelor thesis.
- 2012 – 2016 **Bachelor Physics en Bachelor Mathematics**, *Radboud University*, Both with honours

Working experience

- Nov 2023 – **Project coordinator**, *PUC of Science, Radboud University*, (0.2 FTE)
current I am responsible for organising seminars for high school students and coordinating the *Excellentie programma*, a two-year extracurricular programme for high school students involving a combination of high school and university staff.
- Sep 2016 – **Teacher NLT**, *Radboud University*, (0.2 FTE)
Aug 2018 NLT is a high school science subject, taught by a combination of high schools and universities. I taught for the modules robotics and statistics.
- Sep 2016 – **Computer science teacher**, *Stedelijke Scholengemeenschap Nijmegen*, (0.2 FTE)
Aug 2017 I taught the last two years of high schools, the main content consisted of PHP, SQL and database design.

Skills

- Soft skills **Analytical, Communicative, Motivated**
- Programming Experience with **Python** (a.o. numPy, matplotlib), familiar with **R, PHP** and **SQL**.
- Languages Fully fluent in **Dutch** (native tongue) and **English**.

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
- 2023 Credited for assisting with data processing and analysis: Verhoeven JI, Fan B, Broeders MJM, et al. Association of Stroke at Young Age With New Cancer in the Years After Stroke Among Patients in the Netherlands. *JAMA Netw Open*.
- 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

- titel *Geometry in spectral triples: immersions and fermionic fuzzy geometries*
promotor Dr. M. Khalkhali
co-promotor Dr. W.D. van Suijlekom
summary For a codimension 1 Riemannian immersion $i : X \rightarrow Y$ we define a family of unbounded KK -cycles. We prove that the unbounded product of these cycles with the spectral triple for Y gives, in a suitable limit, the spectral triple for X . This provides an important testcase for understanding maps in non-commutative geometry.
We also consider families of *fuzzy almost-commutative geometries* in the guise of Boltzmann ensembles. We show that these ensembles are random matrix models with a well defined continuum limit and study this limit. This is a first step towards using random fuzzy geometry for quantum gravity.

Selected extracurricular activities

- Sep 2022 – **Organiser of the Graduate Seminar**, *University of Western Ontario*
Aug 2023 As part of a team of four I helped reboot the weekly seminars for master and Ph.D. students at the math department.
- Sep 2021 – **Calculus Instructor**, *University of Western Ontario*
Jan 2022 As instructor I was responsible for designing and giving lectures that supplement the online textbook and videos for two sections of about 100 students each. I also assisted with managing the online learning environment and designing the exams.
- Sep 2014 – **Teaching Assistant**, *Radboud University en University of Western Ontario*
Aug 2023 As TA I was responsible for running tutorials and grading homework and exams. In 2021 I was awarded the *Graduate Student Teaching Award*.
- Sep 2015 – **Studentlid Opleidingscommissie**, *Radboud Universiteit*
Aug 2016 De opleidingscommissie is verantwoordelijk voor de waarborging van de kwaliteit van de wiskunde opleiding, als studentlid was ik betrokken bij het verzamelen en verwerken van feedback en opvolgende acties.