Luuk Verhoeven

Curriculum Vitae

+31 6 23271921
luuksv@gmail.com
www.luuksv.nl

Education

2019 – 2023 **Ph.D. Mathematics**, *University of Western Ontario*, *Promotor: prof. Khalkhali*
Title: *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 and Bachelor Mathematics**, *Radboud University*, Both with honours

Working experience

Sep 2024 – current **Teacher Programming 1**, *Radboud University*, (0.4 FTE)
This is a first-year course for mathematics and physics students, covering the basics of programming. It is taught in Python.

Nov 2023 – current **Project coordinator**, *PUC of Science, Radboud University*, (0.2 FTE)
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 – Aug 2018 **Teacher NLT**, *Radboud University*, (0.2 FTE)
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 – Aug 2017 **Computer science teacher**, *Stedelijke Scholengemeenschap Nijmegen*, (0.2 FTE)
I taught the last two years of high schools, the main content consisted of PHP, SQL and database design.

Skills

Key strengths **Analytical**, **Communicative**, **Motivated**

Programming Experienced with **Python** (a.o. numPy, matPlotLib), familiar with **R**, **PHP**, **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

title *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 $i : X \to Y$ 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 extra activities and events

2024 **Talk in the workshop Noncommutative Geometry Meets Topological Recursion**, *Banff International Research Station, online*

Since 2021 a yearly workshop on the interaction between noncommutative geometry and topological recursion is held. In 2024 I was asked to contribute a full talk on my research.

Sep 2022 – Aug 2023 **Organiser of the Graduate Seminar**, *University of Western Ontario*

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 – Jan 2022 **Calculus Instructor**, *University of Western Ontario*

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.

2021, 2023 **Talks in CMS summer meeting**, *Canadian Mathematical Society*

The CMS summer meeting is a conference of Canadian mathematicians held yearly. In 2021 and 2023 I contributed talks to the session for "noncommutative geometry and mathematical physics".

Sep 2014 – Aug 2023 **Teaching Assistant**, *Radboud Universitity en University of Western Ontario*

As TA I was responsible for running tutorials and grading homework and exams. In 2021 I was awarded the *Graduate Student Teaching Award*. This was besides my studies at the Radboud and formed a part of my responsibilities as a Ph.D. student.

Sep 2015 – Aug 2016 **Studentmember Education committee**, *Radboud Universiteit*

The education committee is responsible for mainting the quality of the mathematics programme. As student member I was involved with collecting and acting on student feedback, as well as policy decisions such as the switch from Dutch to English as main language.

2013 **Young Talent Encouragement Award**

Awarded by the *Koninklijke Hollandse Maatschappij der Wetenschappen* (Royal Dutch Society for the Sciences) for the highest grade average in the Radboud University Mathematics programme.