Curriculum Vitae – Martijn Caspers

Contact details

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Curriculum

'23–now	Associate professor at Delft Institute of Applied Mathematics at TU Delft.
'17–'23	Assistant professor at Delft Institute of Applied Mathematics at TU Delft.
'15– '17	Postdoc and Marie-Curie fellow at Utrecht University.
'13– '15	Postdoc at the Westfälische Wilhelms Universität, Münster.
'12– '13	Postdoc at the Université de Franche-Comté, Besançon.
'08–'12	PhD at the Radboud Universiteit Nijmegen. Adviser: prof. dr. H.T. Koelink. Thesis title: *Non-commutative integration on locally compact quantum groups.*
'03 – '08	Bachelor and Master degree in mathematics at the Radboud Universiteit Nijmegen. Thesis adviser: prof. dr. N.P. Landsman.

PhD students and postdocs

PhD students

'24-'27 (ongoing)	Jesse Reimann. Topic: *Multilinear Schur multipliers.* Joint supervision with Sophie Zegers.
'23-'27 (ongoing)	Enli Chen. Topic: *Rigidity properties of von Neumann algebraic graph products.*
'21-'24	Matthijs Borst. Thesis: *Beyond tracial states in robust self-testing and constructing derivations for quantum Markov semigroups.*
'21-'25	Matthijs Vernooij. Thesis: *Non-commutative optimal transport and dissipation of entropy.*
'19-'23	Gerrit Vos. Thesis: *Multipliers and transference on noncommutative Lp-spaces and the relative Haagerup property.*
'18-'22	Mario Klisse. Thesis: *The structure of Hecke operator algebras.*

Postdocs

'23 - '25 (ongoing)	Teun van Nuland.
'21 - '22	Amudhan Krishnaswamy-Usha, soon starting as assistant professor.
'21 - '23	Jordy Timo van Velthoven, now postdoc at the University of Vienna.

Some statistics on good supervision.
Percentage of PhD theses completed within 4 years and no delay: 4 out of 4 = 100%.
Percentage of all PhD theses in the Netherlands completed within 5 years and within 1 year delay[1] [2]: 40%.
For i.i.d. Bernoulli random variables $X_1, \dots X_4$ with 60%-40% distribution we have $\mathbb{P}(X_1, \dots, X_4 = 1) = 0.4^4 \approx 2.6\%$.

[1] de Goede, M. E. E., R. Belder, and J. de Jonge. 2013. Academische carrières en loopbaanbeleid/Academic careers in the Netherlands. Den Haag: Rathenau Instituut.

[2] Promovendi Netwerk Nederland, *Four years of contract, five+ years of work*, 2025, `hetpnn.nl`.

Grants and awards

Main funding as applicant

'23-'25	NWO M-grant. Project: *Noncommutative multi-linear harmonic analysis and higher order spectral shift*.
'19-'25	NWO Vidi grant. Project: *Non-commutative harmonic analysis and rigidity of operator algebras*.
'18–'22	NWO Cluster grant. Project: *Structure of Hecke von Neumann algebras*.
'16–'18	Marie–Curie fellowship INNEQUAL from the European Union. Project: *Interactions between von Neumann algebras and quantum algebras*.

Main funding as scientfic host

'23	CSC Scholarship for a 4-year PhD for Enli Chen. I act as the host applicant.
'21	FWF Schrödinger fellowship for a 3-year postdoctoral fellowship (2 years at TU Delft, 1 year at the University of Vienna). Grant obtained by J.T. van Velthoven.

Awards

'19	Barbara and Jaroslav Zemanek prize. International annual prize awarded by the Polish Academy for Sciences for achievements in the area of functional analysis with emphasize on operator theory under the age of 35. Announced in the Notices of the AMS (link).
'08	GQT student prize. For 2008's best M.Sc. thesis within the area of the Dutch national cluster for *Geometry and Quantum Theory*.

Smaller funding

Various smaller funding to organize conferences.

'20-'21	*Van Gogh grant* from NUFFIC for exchanging researchers with the University at Besançon with Uwe Franz.

Organization

Committees

'25-now	Faculty Graduate School liaison.
'25	Dutch Mathematical Congress (NMC) Scientific Committee.
'24	NWO Vidi grant committee (chair of the preselection committee).
'23	NWO Vidi grant committee.
'21	NWO Veni grant committee.

PhD defense committees

'25	PhD defense committee Jens de Vries (TU Twente, adviser: F. Schwenninger).
'25	PhD defense committee Kevin Zwart (RU Nijmegen, advisers: E. Koelink, M. Mueger).
'24	PhD defense committee Arvin Lamando (University of Vienna, advisers: F. Luef, P. Balazs).
'24	PhD defense committee Eduardo Tablate (ICMAT Madrid, advisers: J. Parcet, J. Conde-Alonso).
'23	PhD defense committee Kai Zeng (UFC Besançon, advisers: Q. Xu, X. Xiong).
'22	PhD defense committee Teun van Nuland (RU Nijmegen, advise:r W. van Suijlekom).
'19	PhD defense committee Anna Krogager (KU Leuven, adviser: S. Vaes).
'16	PhD defense committee Adrian González-Pérez (ICMAT Madrid, adviser: J. Parcet).

International conferences and workshops

'26 Organizer conference *Groups and operator algebras*. SwissMap at Les Diablerets, Switzerland. With S. Geffen, A. Skalski, A. Valette.

'26 Organizer conference *Harmonic analysis and quantum information theory*. MFO Oberwolfach, Germany. With M. Brannan, L. Turowska, F. Sukochev.

'25 Organizer conference *Operator Algebraic Quantum Groups: Structure, Dynamics, and Geometry*. BIRS Banff Canada. With B. Anderson-Sackaney, M. Brannan, L. Turowska, M. Wasilewski.

'24 Organizer conference *Noncommutativity behind the dunes*. Delft, October, 2024. With T. van Nuland, F. Arici, B. Mesland, S. Zegers, M. Vernooij.

'23 Organizer conference *Noncommutative harmonic analysis and rigidity of operator algebras*. Delft, August, 2023. Organised with the current local team of postdocs and PhD's.

'23 Organizer workshop *Noncommutative harmonic analysis and quantum information*. Mittag-Leffler institute Sweden, June, 2023. With A. Skalski, L. Turowska.

'22 Organizer workshop *Workshop C^*-algebras and geometry of groups and semigroups*. Oslo, May, 2022. With N. Larsen, S. Raum.

'21 Organizer workshop *Quantum Probability and Non-commutative Harmonic Analysis*. Leiden (Lorentz Center), November, 2021. With E. Ricard, A. Skalski.

'21 March 2021. Online workshop *C^*-algebras and geometry of groups and semigroups*. With N. Larsen, S. Raum.

'19 Organizer Oberwolfach mini-workshop *Operator algebraic quantum groups*. Oberwolfach in Germany, October 7–11, 2019. With M. Brannan, A. Kula, M. Weber.

'18 Organizer workshop *Mathematics of quantum information theory*. Leiden (Lorentz Center), May, 2019. With J. Briet, B. Janssens, M. Ozols, B. Terhal.

'16 Organizer winter school *Banach methods in non-commutative geometry: isomorphism conjectures and geometry of groups*. Münster, January 25–29, 2016. Joint with ANR SingStar project. With W. Paravicini and M.-P. Gomez.

'14 Organizer workshop *Quantum groups and operator algebras*. Münster, May 7–9, 2014. With H. Huang and T. Timmermann.

'10 Organizer school *Quantum groups and special functions*. Bizerte in Tunisia. March 20–24, 2010. With E. Koelink.

Single day events

'22 Mini-workshop at the occassion of Mario Klisse's PhD defense.

'21 Delft-Besançon day: 1-day workshop at the occassion of 3 visitors from Besançon in the Van Gogh exchange programme.

Seminars

'17-'21 Organizer of the weekly analysis seminar at TU Delft (with B. Janssens).

Teaching

Qualifications

'19 Obtained *University Teaching Qualification* (UTQ/BKO), issued on July 22, 2019.

'18 *English language test* at level C2 on May 3, 2018.

Teaching for PhD's and postdocs

'25	Lecture series about *Noncommutative harmonic analysis*. South Africa.
'20	Internet Seminar on C*-algebras and dynamics. Local adviser and guidance of 2 student projects. With G. Vos, M. Klisse.
'16	Lecture series about *Approximation properties of operator algebras*. Tehran.
'15	Lecture series at school on *Topological quantum groups*. Bedlewo.

Teaching for BSc- and MSc-students (lectures)

'21-'22	*Introduction to Quantum Information and Computing*. Master course, 1 semester with J. van Neerven.
'19-'24, '25-now	*Spectral theory of linear operators*. Master course, 1 semester each year, from '25 with S. Zegers.
'17-'21	*Quantum information theory*. Master course, 1 semester each year. Written lecture notes.
'17-'19, '25-now	*Calculus*. Several 1st year courses for engineering students.
'17	*Functional analysis (advanced)*. Master course/mastermath, 1 semester with D. Frey.
'16-'19,'22-'25	*Operator algebras*. Master course/mastermath.
'15-'17	*Group theory*. Bachelor course, 1 semester each year.

Highlights by supervised Bachelor and Master students

	Theses by Matthijs Borst, Arjan Cornelissen, Jesse Reimann, Guillermo Wildschut, Emiel Huisman were published.
'23	Second prize for Jesse Reimann for the *KHMW graduation prize*. Annual prize to best Master graduate in the Netherlands in mathematics. Master thesis published in the Mathematische Annalen.
'18	First prize for Arjan Cornelissen for the *KHMW ASML graduation prize*. Annual prize to best Master graduate in the Netherlands in mathematics.

Master thesis projects

'24	Emiel Huisman – Multiple operator integrals into S_p for $0 < p < 1$. Thesis will appear as preprint.
'23	Jesse Reimann – Multiple operator integrals and transference techniques. Thesis published in the Mathematische Annalen.
'23	Jinshi Fu – Triangle inequalities of quantum Wasserstein distances on noncommutative tori.
'23	Kevin Veerkamp – Multilinear Fourier multipliers of a locally compact group.
'22	Christos Kitsios (with Jordy van Velthoven) – Convolution dominated matrices in groups of polynomial growth.
'22	Sam van Poelgeest (with David Elkouss) – Information theoretic quantities of quantum channels with partition quantum group symmetries.
'21	Vincent Li – Gradient flow and quantum Markov semigroups with detailed balance.
'21	Luc Janssen – Non-commutative differentiation and estimates on operator integrals.
'21	Matthijs Borst – Constructing gradient-S_p quantum Markov semi-groups to obtain strong solidity results for von Neumann algebras. Thesis published in Groups, Geometry and Dynamics.
'20	Guillermo Wildschut – Strong solidity of q-Gaussian algebras.
'19	Gerrit Vos – Quantum correlation matrices and Tsirelson's problem.
'19	Floris Elzinga (with Dirk Schuricht, UU) – Deformed CCR/CAR and Free Monotone Transport: Quons and Fock Parafermions.
'18	Arjan Cornelissen (with Ronald de Wolf, CWI) – Quantum gradient estimation and its applications to quantum reinforcement learning. Thesis is published.

Bachelor thesis projects

'25 Nadine van Rossum – Generating conjectures on multi-linear Schur multipliers with computer approximations.

'25 Thomas van Baar – Increasing entropy of sums of random variables.

'25 Wouter Bosse (with Jesse Reimann) – Formalizing harmonic analysis in Lean.

'23 Max Verbarendse (with Matthijs Vernooij, Sjoerd Stalberg) – Liquid crystals.

'22 Brian Witmer – Single-qubit systems: determining the density matrix of a qubit in closed and open quantum systems when considering free evolution and weak measurements.

'21 Daniel Veldhuizen (with Maximilian Russ, Lieven Vandersypen) – Subspace randomized benchmarking prediction protocol for the average gate fidelity of multi-qubit devices.

'21 Siem van Benthem (with Mario Klisse) – The Krein-Milman theorem and its applications.

'21 Hidde de Bos (with Yaroslav Blanter) – Quantum Markov semigroups and the Lindblad master equation.

'20 Kevin Veerkamp – Bell inequalities and their maximal violation.

'19 Martin van Denzen – Speicher's central limit theorem.

'18 Nando Leijenhorst (with David Elkouss) – Quantum error correction: decoders for the toric code.

'18 Guillermo Wildschut – A conjecture on the complete boundedness of Schur multipliers. Thesis published in Arkiv der Mathematik.

'17 Lennert den Besten – Amenability and paradoxality of groups.

'17 Artuur Oerlemans – Weaver's conjecture.

'17 Geert Doek – Gromov's theorem on groups with polynomial growth.

Outreach

'21 Profcast, interview taken by Dave Boomkens and Marieke Kootte, published as PodCast, available here (link) on Spotify.

'20 Oberwolfach Snapshot on 'Quantum Symmetry', popular text aimed at high school students, see publication list, available here (link).

'16 U-talent programme. Project for high school students (profielwerkstuk) on shuffling puzzles and symmetry groups of Rubik's cubes.

'16 One–day workshop *The geometry of discrete groups* as part of the summer school *Geometry* (Utrecht). Lecture notes available here (link).

Publication list

1. M.C., Enli Chen, *Internal graphs of graph products of hyperfinite II_1-factors*, arXiv: 2505.05179.
2. Matthijs Borst, M.C., Enli Chen, *Rigid graph products*, arXiv: 2408.06171.
3. M.C., J. Reimann, *On the best constants of Schur multipliers of second order divided difference functions*, Math. Ann. **392** (2025), no. 1, 1119–1166..
4. M. Borst, M.C., *Classification of right-angled Coxeter groups with a strongly solid von Neumann algebra*, J. Math. Pures Appl. (9) **189** (2024), 103591.
5. M.C., *A Sobolev estimate for radial L^p-multipliers on a class of semi-simple Lie groups*, Trans. Amer. Math. Soc. **376** (2023), no. 12, 8919–8938.
6. M.C., M. Klisse, A. Skalski, G. Vos, M. Wasilewski, *Relative Haagerup property for arbitrary von Neumann algebras*, Adv. Math. **421** (2023), Paper No. 109017.
7. M.C., B. Janssens, A. Krishnaswamy-Usha, L. Miaskiwskyi, *Local and multilinear noncommutative de Leeuw theorems*, Math. Ann. **388** (2024), no. 4, 4251–4305.
8. M.C., *On the isomorphism class of q-Gaussian W^*-algebras for infinite variables*, C. R. Math. Acad. Sci. Paris **361** (2023), 1711–1716.
9. M.C., J. T. van Velthoven, *Overcompleteness of coherent frames for unimodular amenable groups*, Ark. Mat. **61** (2023), no. 2, 277–299.
10. M.C., A. Krishnaswamy-Usha, G. Vos, *Multilinear transference of Fourier and Schur multipliers acting on non-commutative L^p-spaces*, Canad. J. Math. **75** (2023), no. 10. 1986–2006.
11. M. Borst, M.C., M. Wasilewski, *Bimodule coefficients, Riesz transforms on Coxeter groups and strong solidity*, Groups Geom. Dyn. **18** (2024), no. 2, 501–549.
12. M. Borst, M.C., M. Klisse, M. Wasilewski, *On the isomorphism class of q-Gaussian C^*-algebras for infinite variables*, Proc. Amer. Math. Soc. **151** (2023), no. 2, 737–744.
13. M.C., J.T. van Velthoven, *Density conditions with stabilizers for lattice orbits of Bergman kernels on bounded symmetric domains*, Math. Z. **302**, 609–628 (2022).
14. M.C., *Riesz transforms on compact quantum groups and strong solidity*, J. Inst. Math. Jussieu **21** (2022), no. 6, 2135–2171.
15. M.C., G. Vos, *BMO spaces of sigma-finite von Neumann algebras and Fourier-Schur multipliers on quantum $SU(2)$*, Studia Math. **262** (2022), no. 1, 45-–91.
16. M.C., F. Sukochev, D. Zanin, *Weak $(1,1)$ estimates for multiple operator integrals and generalized absolute value functions*, Israel J. Math. **244** (2021), no. 1, 245—271.
17. M.C., Y. Isono, M. Wasilewski, *L_2-cohomology, derivations and quantum Markov semi-groups on q-Gaussian algebras*, Int. Math. Res. Not. IMRN 2021, no. 9, 6405—6441.
18. M.C., *Gradient forms and strong solidity of free quantum groups*, Math. Ann. **379** (2021), no. 1-2, 271—324.
19. M.C., M. Klisse, N. Larsen, *Graph product Khintchine inequalities and Hecke C^*-algebras: Haagerup inequalities, (non)simplicity, nuclearity and exactness*, J. Funct. Anal. 280 (2021), no. 1, 108795.
20. M.C., M. Junge, F. Sukochev, D. Zanin, *BMO-estimates for non-commtutative vector valued Lipschitz functions*, J. Funct. Anal. **278** (2020), no. 3, 108317.
21. M.C., *Absence of Cartan subalgebras for Hecke von Neumann algebras*, Anal. PDE **13** (2020), no. 1, 1–28.
22. M.C., A. Skalski, M. Wasilewski, *On MASA's in q-deformed von Neumann algebras*, Pacific J. Math. **302** (2019), no. 1, 1–21.
23. M.C., G. Wildschut, *On the complete bounds of L_p-Schur multipliers*, Arch. Math. (Basel) **113** (2019), no. 2, 189-–200.

24. M.C., A. Skalski, *On C^*-completions of discrete quantum group rings*, Bull. London Math. Soc. **51** (2019), no. 4, 691–704.
25. M.C., *Harmonic analysis and BMO-spaces of free Araki-Woods factors*, Studia Math. **246** (2019), no. 1, 71—107.
26. M.C., D. Potapov, F. Sukochev, D. Zanin, *Weak type commutator and Lipschitz estimates: resolution of the Nazarov-Peller conjecture*, Amer. J. Math. **141** (2019), no. 3, 593–610.
27. M.C., D. Potapov, F. Sukochev, D. Zanin, *Weak type operator Lipschitz and commutator estimates for commuting tuples*, Ann. Inst. Fourier (Grenoble) **68** (2018), no. 4, 1643—1669.
28. M.C., P. Fima, *Graph products of operator algebras*, J. Noncommut. Geom. **11** (2017), no. 1, 367–411.
29. M.C., *Connes embeddability of graph products*, Infin. Dimens. Anal. Quantum Probab. Relat. Top. **19** (2016), no. 1, 1650004, 13 pp.
30. M.C., J. Parcet, M. Perrin, E. Ricard, *Noncommutative de Leeuw theorems*, Forum of Mathematics - Sigma **3** (2015), e21.
31. M.C., A. Skalski, *The Haagerup property for arbitrary von Neumann algebras*, Int. Math. Res. Not. IMRN 2015, no. 19, 9857–9887.
32. M.C., M. de la Salle, *Schur and Fourier multipliers of an amenable group acting on non-commutative L^p-spaces*, Trans. Amer. Math. Soc. **367** (2015), no. 10, 6997–7013.
33. M.C., D. Potapov, F. Sukochev, D. Zanin, *Weak type estimates for the absolute value mapping*, J. Operator Theory **73** (2015), no. 2, 361–384.
34. M.C., A. Skalski, *The Haagerup approximation property for von Neumann algebras via quantum Markov semigroups and Dirichlet forms*, Comm. Math. Phys. **336** (2015), no. 3, 1637–1664.
35. M.C., H.H. Lee, E. Ricard, *Operator biflatness of the L^1-algebras of compact quantum groups*, J. Reine Angew. Math. **700** (2015), 235–244 (Crelle).
36. M.C., S. Montgomery-Smith, D. Potapov, F. Sukochev, *The best constants for operator Lipschitz functions on Schatten classes*, J. Funct. Anal. **267** (2014), 3557–3579.
37. M.C., R. Okayasu, A. Skalski, R. Tomatsu, *Generalisations of the Haagerup approximation property to arbitrary von Neumann algebras*, C. R. Acad. Sci. Paris, Ser. I **352** (2014), 507–510.
38. M.C., *Weak amenability of locally compact quantum groups and approximation properties of extended quantum SU(1,1)*, Comm. Math. Phys. **331** (2014), no. 3, 1041–1069.
39. M.C., D. Potapov, F. Sukochev, *The Walsh basis in the L^p-spaces of hyperfinite III_λ factors,* $0 < \lambda \leq 1$, J. Math. Anal. Appl. **408** (2013), 154–164.
40. M.C., *The L^p-Fourier transform on locally compact quantum groups*, J. Operator Theory **69** (2013), 101–133.
41. M.C., *Spherical Fourier transforms on locally compact quantum Gelfand pairs*, SIGMA **7** (2011), 087, 39 pages.
42. M.C., E. Koelink, *Modular properties of matrix coefficients of corepresentations of a locally compact quantum group*, J. Lie Theory **21** (2011), 905–928.
43. M.C., C. Heunen, K. Landsman, B. Spitters, *Intuitionistic quantum logic of an n-level system*, Foundations of Physics **39** (2009), 731–759.

Book chapter

44. M.C., *On the endpoints of De Leeuw restriction theorems*, Positivity and noncommutative analysis, 49–60, Trends Math., Birkhäuser/Springer, Cham, (2019).

Reports

45. M.C., *Quantum Symmetry*, Oberwolfach snapshot (popular article), published as: Snapshots of modern mathematics from Oberwolfach; 2020, 09.
46. M.C., M. Brannan, M. Weber, A. Wysoczanska-Kula, Mini-workshop: operator algebraic quantum groups, editors, Oberwolfach Rep. 16 (2020), no. 4, 2821-–2867.
47. M.C., *Gradient forms and strong solidity of free quantum groups*, Oberwolfach report (2018).
48. M.C., *Hecke von Neumann algebras, operator spaces and absence of Cartan subalgebras*, Oberwolfach report (2016).
49. M.C., *Noncommutative De Leeuw theorems*, Oberwolfach Reports 2 (2015), 1631-1700.

Lecture notes

50. M.C., *Analysis in quantum information theory*, lecture notes for a course taught at TU Delft (2018-2021), 118 pages. Unpublished.
51. M.C., *Locally compact quantum groups*, lecture notes for a summer school in Bedlewo 2015, Banach Center Publications **111** (2017), 153-184.
52. M.C., E. Koelink, *Quantum groups and special functions*, lecture notes for a summer school in Bizerte 2010, 99 pages. Unpublished.