

Bert Lindenhovius

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Personal information

Full name **Albertus Johannis Lindenhovius.**
Date of birth **October 20, 1984.**
Place of birth **Den Helder, the Netherlands.**
Nationality **Netherlands.**

Languages

Dutch Native
English Highly proficient CAE certificate 2010
German Basic communication skills
Spanish Basic communication skills

Employment

June 2024–
present **Principal Investigator on the FWF-funded project "Quantization by Internalization"**, *Johannes Kepler Universität Linz, Institut für Mathematische Methoden in Medizin und Datenbasierter Modellierung.*

June
2023–June
2024 **Researcher**, *Mathematical Institute of the Slovak Academy of Sciences.*

Jan. 2021–
May 2023 **Postdoctoral Fellow**, *Johannes Kepler Universität Linz, Institut für Mathematische Methoden in Medizin und Datenbasierter Modellierung.*

July 2016–
Dec. 2020 **Postdoctoral Fellow**, *Tulane University New Orleans, Department of Computer Science.*

Sept. 2011–
Sept. 2015 **PhD candidate**, *Radboud University Nijmegen, Institute for Mathematics, Astrophysics and Particle Physics.*

2010 **Teaching Assistant**, *University of Amsterdam, Department of Mathematics..*

Education

July 2016 **PhD Mathematics**, *Radboud University Nijmegen*, Thesis: $\mathcal{C}(A)$, Advisor: Prof. N.P. Landsman.

July 2011 **MSc Mathematical Physics**, *University of Amsterdam*, Thesis: *Instantons and the ADHM construction*, Advisor: Prof. R.H. Dijkgraaf.

August 2010 **BSc Mathematics**, *Free University Amsterdam*, Thesis: *De Onvolledigheidsstelling van Gödel*, Advisor: Prof. J.J. Dijkstra.

August 2007 **BSc Physics**, *Free University Amsterdam*, Thesis: *The Unruh Effect*, Advisor: Dr. D. Boer.

June 2002 **Gymnasium**, *Studiehuis Molenplein*, Den Helder.

Awarded grants

2024 **FWF Principal Investigator Project**, Title: *Quantization by Internalization*, Budget: €293,918, <https://www.fwf.ac.at/en/research-radar/10.55776/PAT6443523>.

Honors and Awards

2024 **Marie Skłodowska-Curie Seal of Excellence**.

Participation to Funded projects

2021–2023 **The many facets of orthomodularity**, *FWF/GAČR project under supervision of Dr. Thomas Vetterlein at Johannes Kepler University, Linz*.

2016–2020 **Semantics, Formal Reasoning, and Tool Support for Quantum Programming**, *Department of Defence Multi-University Research Initiative (DoD-MURI) under supervision of Prof. Dr. M. Mislove at Tulane University, New Orleans*.

2011–2015 **The logic of composite quantum systems**, *NWO TOP-GO project under supervision of Prof. Dr. B. Jacobs, Prof. Dr. N.P. Landsman, and Prof. Dr. I. Moerdijk at Radboud University, Nijmegen*.

Teaching Experience

Fall 2019 **Introduction to Discrete Math**.

Spring 2019 **Introduction to Discrete Math**.

Spring 2018 **Operator Algebras**.

Spring 2017 **Calculus III**.

Fall 2013 **Introduction to Functional Analysis**, *Teaching Assistent*.

Fall 2012 **The Structure of Spacetime**, *Teaching Assistent*.

Spring 2012 **Rings and Fields 1**, *Teaching Assistent*.

Fall 2011 **Operator Algebras**, *Teaching Assistent*.

Fall 2010 **Calculus 1**, *Teaching Assistent*.

Supervising

2018 **Eva-Maria Hekkelman**, *BSc thesis 'Properties of the Lattice $\mathcal{O}(\Sigma_A)$ Concerning Intuitionistic Quantum Logic'*, Main supervisor: Prof. Dr. N.P. Landsman.

2018 **Quinten Rutgers**, *BSc thesis 'Intuitionistic quantum logic'*, Main supervisor: Prof. Dr. N.P. Landsman.

Management

- 2003–2006 **Member of the Programme Committee Physics**, *Free University Amsterdam*.
2013 **Co-organizer Nederlands Mathematisch Congres (Dutch Mathematical Congress)**.

Publication list

- 2024 A. Kornell, B. Lindenhovius, M. Mislove, *Categories of quantum cpos*, preprint, arXiv:2406.01816 (2024)
- 2023 G. Jenča, B. Lindenhovius, *Quantum Suplattices*, Proceedings of the 20th International Conference on Quantum Physics and Logic 58–74 (2023)
- 2023 B. Lindenhovius, M. Mislove, V. Zamdzhiev, *Semantics for a Lambda Calculus for String Diagrams*. In: A. Palmigiano, M. Sadrzadeh, *Samson Abramsky on Logic and Structure in Computer Science and Beyond*, 973–1004, Springer (2023)
- 2023 B. Lindenhovius, Th. Vetterlein, *A characterisation of orthomodular spaces by Sasaki maps*, International Journal of Theoretical Physics, 62:59 (2023)
- 2022 J. Harding, B. Lindenhovius, *Orthogeometries and AW*-algebras*, the Houston Journal of Mathematics, Vol. 48, No. 1, Pages 33—58 (2022)
- 2022 A. Kornell, B. Lindenhovius, M. Mislove, *A category of quantum posets*, Indagationes Mathematicae, Volume 33, Issue 6, 1137–1171 (2022)
- 2022 X. Jia, A. Kornell, B. Lindenhovius, M. Mislove, V. Zamdzhiev, *Semantics for variational Quantum programming*, Proceedings of the ACM on Programming Languages, Volume 6, Issue POPL, Article No. 26, pp 1–31 (2022)
- 2021 B. Lindenhovius, M. Mislove, V. Zamdzhiev, *LNL-FPC: The Linear/Non-linear Fixpoint Calculus*, Logical Methods in Computer Science, Vol. 17, Issue 2, Pages 9:1 – 9:61 (2021)
- 2021 X. Jia, B. Lindenhovius, M. Mislove and V. Zamdzhiev, *Commutative Monads for Probabilistic Programming Languages*, 36th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS), pp. 1-14 (2021)
- 2020 A. Kornell, B. Lindenhovius, M. Mislove, *Quantum CPOs*, Proceedings of the 17th International Conference on Quantum Physics and Logic 174–187 (2020)
- 2019 J. Harding, C. Heunen, B. Lindenhovius, M. Navara, *Boolean Subalgebras of Orthoalgebras*, Order, Volume 36, Issue 3, pp 563–609, (2019)
- 2019 C. Heunen, B. Lindenhovius, *Domains of commutative C*-subalgebras*, Mathematical Structures in Computer Science, 29(7):972–1006, (2019)
- 2019 B. Lindenhovius, M. Mislove, V. Zamdzhiev, *Mixed linear and non-linear recursive types*, Proceedings of the ACM on Programming Languages archive Volume 3 Issue ICFP, Article No. 111 (2019)
- 2018 B. Lindenhovius, M. Mislove, V. Zamdzhiev, *Enriching a Linear/Non-linear Lambda Calculus: A Programming Language for String Diagrams*, Proceeding LICS '18 Proceedings of the 33rd Annual ACM/IEEE Symposium on Logic in Computer Science Pages 659-668 (2018)

- 2018 K. Landsman, B. Lindenhovius, *Symmetries in Exact Bohrification*. In: Ozawa M., Butterfield J., Halvorson H., Rédei M., Kitajima Y., Buscemi F. (eds) *Reality and Measurement in Algebraic Quantum Theory*. NWW 2015. Springer Proceedings in Mathematics & Statistics, vol 261. Springer, (2018)
- 2015 C. Heunen, B. Lindenhovius, *Domains of commutative C^* -subalgebras*, Proceedings of the 30th annual ACM/IEEE symposium on Logic in Computer Science 450-461 (2015)
- 2015 A.J. Lindenhovius, *Classifying finite-dimensional C^* -algebras by posets of their commutative C^* -subalgebras*, International Journal of Theoretical Physics: Volume 54, Issue 12, 4615-4635 (2015)
- 2014 B. Lindenhovius, *Grothendieck topologies on a poset*, preprint, arXiv:1405.4408 (2014)

Program Committees

- 2022 PLanQC 2022. PC member Third International Workshop on Programming Languages for Quantum Computing 2022.
- 2021 ACT 2021. PC member for the international conference on Applied Category Theory in 2021.

Reviewing

- Journals ACM Transactions on Quantum Computing
International Journal of Theoretical Physics
Order
Proceedings of the Royal Society A
- Conferences Symposium on Logic in Computer Science (LiCS)
Quantum Physics and Logic (QPL)
International Workshop on Programming Languages for Quantum Computing (PlanQC)
International Conference on Applied Category Theory (ACT)
Computer Science Logic (CSL)

Research Visits

- 2018 Schloss Dagstuhl – Leibniz Center for Informatics (Wadern, Germany). Quantum Programming Languages (16.09.2018 – 21.09.2018)
- 2018 Lorentz Center (Leiden, The Netherlands). Logical Aspects of Quantum Information (30.07.2018 - 3.08.2018)
- 2016 Simons Institute for the Theory of Computing (UC Berkeley). Logical Structures in Computation (17.10.2016 - 16.11.2016)

Invited talks

- November 25, 2022 *Quantization and Fuzzification by Internalization*, Workshop on General Algebra and Ordered Sets 2022, Karolinka, Czech Republic
- September 16, 2018 *Operator algebras and their role in quantum programming languages*, Dagstuhl Seminar 18381 Quantum Programming Languages, Dagstuhl, Germany

- March 19, 2018 *Posets of Commutative C^* -subalgebras*, Combining Viewpoints in Quantum Theory workshop, University of Edinburgh, United Kingdom
- October 20, 2016 *Posets of Commutative C^* -subalgebras*, Simons Institute, University of California Berkeley, United States

Talks and Conferences

- July 4, 2024 *Semicartesian categories of relations*, Topology, Algebra, and Categories in Logic (TACL), Barcelona, Spain
- June 25, 2024 *Semicartesian categories of relations*, International Category Theory Conference CT2024, Santiago de Compostela, Spain
- December 13, 2023 *Discrete Quantization*, Seminar of the Mathematical Institute of the Slovak Academy of Sciences, Bratislava, Slovakia
- September 4, 2023 *Quantum Suplattices*, Summer School on General Algebra and Ordered Sets 2023, Stará Lesná, High Tatras, Slovakia
- July 17, 2023 *Quantum Suplattices*, Quantum Physics and Logic (QPL), Paris, France
- July 1, 2022 *A characterisation of orthomodular spaces by Sasaki maps*, Fifteenth Biennial International Quantum Structure Conference 2022 (IQSA)
- June 27, 2022 *Quantizing partially ordered structures*, Fifteenth Biennial International Quantum Structure Conference 2022 (IQSA)
- June 10, 2022 *Quantizing partially ordered structures*, 39th Linz Seminar on Fuzzy Set Theory
- September 5, 2021 *Posets of Boolean subalgebras*, Workshop on General Algebra and Ordered Sets 2021, Karolinka, Czech Republic
- July 10, 2020 *Quantum CPOs*, Applied Category Theory, keynote talk
- June 4, 2020 *Quantum CPOs*, Quantum Physics and Logic (QPL)
- January 18, 2020 *Quantum CPOs and semantics of PQM*, Muri Project meeting, Tulane University, New Orleans, United States
- March 8, 2019 *Recursion in circuit description languages*, Muri project meeting, University of Maryland, Baltimore, United States
- January 7, 2019 *Recursive types for linear/non-linear quantum programming*, Loria, University of Lorraine, France
- August 3, 2018 *Posets of Commutative C^* -subalgebras*, Logical Aspects of Quantum Information, Lorentz Center, Leiden, the Netherlands
- October 29, 2017 *Categorical models of circuit description languages*, Category Theory Oktoberfest, Carnegie Mellon University, Pittsburgh, United States
- August 18, 2017 *Reconstructing an orthomodular poset from its poset of Boolean subalgebras*, BLAST, Vanderbilt University, United States
- July 4, 2017 *Projections and Posets of Commutative C^* -subalgebras*, IQSA, Radboud University Nijmegen, the Netherlands
- July 16, 2015 *Dcpo's of commutative C^* -subalgebras*, Quantum Physics and Logic (QPL), Oxford, United Kingdom
- July 8, 2015 *Domains of commutative C^* -subalgebras*, Logic in Computer Science (LiCS), Kyoto, Japan

- April 15, 2015 *Reconstructing C^* -algebras from their posets of commutative C^* -subalgebras*, Netherlands Mathematisch Congres (Dutch Mathematical Congress), Leiden, the Netherlands
- June 23, 2014 *Reconstructing a C^* -algebra from its Poset of Commutative C^* -subalgebras*, Biennial International Quantum Structures Association Conference (IQSA), Olomouc, Czech Republic

Collaborations

John Harding College of Arts & Sciences, Department of Mathematical Sciences, New Mexico State University, USA

Chris Heunen, University of Edinburgh, UK

Geza Jenča, Slovak University of Technology, Bratislava, Slovakia

Anna Jenčová, Mathematical Institute of the Slovak Academy of Sciences, Bratislava, Slovakia

Xiaodong Jia, Hunan University, Changsha, China

Andre Kornell, Tulane University, New Orleans, USA

Michael Mislove, Tulane University, New Orleans, USA

Mirko Navara, Czech Technical University, Prague, Czech Republic

Isar Stubbe, Université du Littoral-Côte d'Opale, Calais, France

Thomas Vetterlein, Johannes Kepler University, Linz, Austria

Vladimir Zamdzhiev, Inria/Saclay, Paris, France

About me

My main fields of interest are Operator Algebras, Operator Spaces, Orthomodular Lattices, Domain Theory and Category Theory. I am especially interested in mathematical problems that are inspired by questions from other fields such as physics and computer science. Currently, I am mainly interested in mathematical quantization, i.e., generalizing mathematical structures to the noncommutative setting via operator algebras and operator spaces. In particular, I am driven by potential applications of quantization to quantum information theory and quantum computing.