Floris van Doorn

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Education and Employment

2023 – present W2 professor, Mathematical Institute, University of Bonn.
2021 – 2023 Postdoctoral Associate, Mathematics Department, University of Paris-Saclay.
2018 – 2021 Postdoctoral Associate, Mathematics Department, University of Pittsburgh.
2013 – 2018 Ph.D. in Pure and Applied Logic, Carnegie Mellon University.
Dissertation: *On the Formalization of Higher Inductive Types and Synthetic Homotopy Theory*.
Advisors: Jeremy Avigad, Steve Awodey.
2011 – 2013 M.Sc. (cum laude), Mathematical Sciences, Utrecht University.
Thesis: *Explicit convertibility proofs in Pure Type Systems.*
Advisor: Freek Wiedijk.
2008 – 2011 B.Sc. (cum laude), Mathematics, Utrecht University.
2008 – 2011 B.Sc. (cum laude), Physics and Astronomy, Utrecht University.

Publications

2024 *Integrals Within Integrals: A Formalization of the Gagliardo-Nirenberg-Sobolev Inequality*, Floris van Doorn, Heather Macbeth. Interactive Theorem Proving (ITP) 2024.
2023 *Formalising the h-principle and sphere eversion*, Patrick Massot, Floris van Doorn, Oliver Nash. Certified Programs and Proofs (CPP) 2023.
2021 *Progress on a Perimeter Surveillance Problem*, Jeremy Avigad, Floris van Doorn. Thirty-Fifth Annual International Conference on Autonomous Systems (ICAS).
2021 *Formalized Haar Measure*, Floris van Doorn. Interactive Theorem Proving (ITP).
2020 *Maintaining a Library of Formal Mathematics*, Floris van Doorn, Gabriel Ebner, and Robert Y. Lewis. 13th Conference on Intelligent Computer Mathematics (CICM).
2020 *Sequential Colimits in Homotopy Type Theory*, Kristina Sojakova, Floris van Doorn, Egbert Rijke. Thirty-Fifth Annual ACM/IEEE Symposium on Logic in Computer Science (LICS).
2020 *A Formal Proof of the Independence of the Continuum Hypothesis*, Jesse Michael Han and Floris van Doorn. Certified Programs and Proofs (CPP).
2020 *The Lean Mathematical Library*, the mathlib community.[1] Certified Programs and Proofs (CPP).
2019 *A Formalization of Forcing and the Unprovability of the Continuum Hypothesis*, Jesse Michael Han and Floris van Doorn. Interactive Theorem Proving (ITP).
2018 *Higher Groups in Homotopy Type Theory*, Ulrik Buchholtz, Floris van Doorn, Egbert Rijke. Logic in Computer Science (LICS).
2017 *Homotopy Type Theory in Lean*, Floris van Doorn, Jakob von Raumer, Ulrik Buchholtz. 8th International Conference on Interactive Theorem Proving (ITP).

[1] This was a paper written collectively by the contributors to `mathlib`. I wrote part of the paper.

2016 *Constructing the Propositional Truncation using Non-recursive HITs*, Floris van Doorn. The 5th ACM SIGPLAN Conference on Certified Programs and Proofs (CPP).

2015 *The Lean Theorem Prover (System Description)*, Leonardo de Moura, Soonho Kong, Jeremy Avigad, Floris van Doorn, Jakob von Raumer. The 25th jubilee edition of the International Conference on Automated Deduction (CADE). This paper won the Skolem Award in 2025.

2014 *The Structural Theory of Pure Type Systems*, Cody Roux and Floris van Doorn. LNCS Advanced Research in Computing and Software Science.

2013 *Explicit Convertibility Proofs in Pure Type Systems*, Floris van Doorn, Herman Geuvers, Freek Wiedijk. Workshop on Logical Frameworks and Meta-languages: Theory and Practice (LFMTP).

Teaching

2025 Instructor for The Logic of Proof Assistants (Bonn).
2024 Instructor for Formalized Mathematics in Lean (Bonn).
2024 Instructor for Collaborative Formalization Project in Analysis (Bonn).
2023 Instructor for Formalized Mathematics in Lean (Bonn).
2021 Instructor for Abstract Algebra (Pitt).
2020 Instructor for Topics in Geometry (Pitt).
2019 Instructor for Calculus I (Pitt).
2016 TA for Differential and Integral Calculus with Russell C. Walker (CMU).
2015 TA for Logic and Mathematical Inquiry with Jeremy Avigad (CMU).
2015 TA for Game Theory with Adam Bjorndahl (CMU).
2014 TA for Formal Logic with Steve Awodey (CMU).
2012 TA for Discrete Mathematics with Han Hoogeveen (Utrecht).
2011 TA for Foundations of Mathematics with Jaap van Oosten (Utrecht).

Grants, Awards and Competitions

2025 Skolem award for the paper *The Lean Theorem Prover (System Description)*.
2025 Principal Investigator for the renewal of the DFG Excellence Strategy – EXC-2047/1 – 390685813.
2024 Application partner of NFDI 29/1 MaRDI (Mathematische Forschungsdateninitiative).
2021 Labex Mathématiques Hadamard 2-year Postdoctoral Fellowship in the area Mathematics for Artificial Intelligence.
2012 First prize at the International Mathematics Competition for University Students.
2011 Second prize at the International Mathematics Competition for University Students.
2010 Second prize at the International Mathematics Competition for University Students.
2009 Royal Holland Society of Sciences and Humanities "Young Talent Incentive Price" for mathematics.
2008 Silver medal at the International Mathematical Olympiad.

Unpublished Work

2022 *Designing a general library for convolutions*, Floris van Doorn. Preprint.

2016 *Logic and Proof*, Jeremy Avigad, Robert Y. Lewis, Floris van Doorn. Online textbook for an introductory course to logic and proof assistants.

2014 *Propositional Calculus in Coq*, Floris van Doorn. Short article.

2013 *Explicit Convertibility Proofs in Pure Type Systems*, Floris van Doorn. Master thesis. Advisor: Freek Wiedijk.

Service

2019 – present	Maintainer for Lean's mathematical library `Mathlib`.
2025	Organizer for Simons Institute for the Theory of Computing and SLMath Joint Workshop: AI for Mathematics and Theoretical Computer Science
2024	Program Committee for Interactive Theorem Proving (ITP).
2024	Scientific organizer for the Workshop Computer-verified proofs: 48 hours in Rome.
2020 – 2022	Program Committee for Certified Programs and Proofs (CPP).
2021	Program Committee for the Workshop on Homotopy Type Theory / Univalent Foundations (HoTT/UF) 2021.
2021	Problem Committee for the Proof Ground 2021 Interactive Proving Contest.

Besides that, I have also reviewed 13 manuscripts as external reviewer for the conferences and journals:
Conference on Intelligent Computer Mathematics (CICM), Experimental Mathematics Foundations of Software Science and Computation Structures (FOSSACS), Interactive Theorem Proving (ITP), Journal of Automated Reasoning, Logical Methods in Computer Science (LMCS), Mathematical Structures in Computer Science, Transactions on Computational Logic, Types Conference and Workshop on Homotopy Type Theory / Univalent Foundations (HoTT/UF). Furthermore, I have been an anonymous reviewer for 12 grant applications and a PhD thesis evaluation.

Selected Invited Talks

2025 *Progress report on the Carleson Project*, Lean together, online

2024 *Formalizing a proof of Carleson's theorem*, Homotopy Type Theory Electronic Seminar Talks (HoTTEST), online.

2024 *Carleson operators on doubling metric measure spaces*, joint with Christoph Thiele, Special Topic School: Maximal Operators and Applications, Bonn.

2024 *The Sobolev inequality in Lean*, Informal Formalization Seminar.

2024 *The internals of Lean*, 48 hours in Rome.

2023 *Formalizing sphere eversion using Lean's mathematical library*, CALCO 2023 & MFPS XXXIX, Bloomington, Indiana.

2023 *Tutorial on interactive theorem proving in Lean*, Logic Colloquium, Milan.

2023 *What can we learn from formalizations in homotopy type theory?*, Formalization of Cohomology Theories, Banff International Research Station.

2023 *Formalizing sphere eversion in Lean*, INRIA, Nantes.

2022 *Lessons Learned from Formalizing Local Convex Integration*, Lean in Lyon.

2018 *Towards Spectral Sequences for Homology*, Homotopy Type Theory Electronic Seminar Talks (HoTTEST), online.

2018 *Spectral Sequences in Homotopy Type Theory*, Workshop: Types, Homotopy Type theory, and Verification, Hausdorff Research Institute for Mathematics.

2017 *Homotopy Type Theory in Lean*, Computer-aided mathematical proof, Cambridge.

2017 *Eilenberg–MacLane Spaces in Homotopy Type Theory*, ASL North American annual meeting, Boise.

Languages

Dutch (native), English (fluent), French (intermediate), German (basic).
Computer languages: Fluent in Lean, LaTeX, Mathematica, Coq.
Experience with Python, C, Standard ML.