




# NIELS VAN DER WEIDE





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Postdoctoral Researcher at Eötvös Loránd University, Budapest, Hungary

## Education

- Ph.D.** in Computer Science / Radboud University 2016 — 2020  
ADVISOR: Herman Geuvers, Ralf Hinze *Nijmegen, NL*  
DISSERTATION: [Constructing Higher Inductive Types](#) 
- M.Sc.** in Computer Science / Radboud University 2014 — 2016  
ADVISOR: Herman Geuvers *Nijmegen, NL*  
DISSERTATION: [Higher Inductive Types](#) 
- M.Sc.** in Mathematics / Radboud University 2014 — 2015  
ADVISOR: Ieke Moerdijk *Nijmegen, NL*  
DISSERTATION: [Model Structures on Toposes](#) 
- B.Sc.** in Mathematics / Radboud University 2010 — 2014  
*Nijmegen, NL*
- B.Sc.** in Computer Science / Radboud University 2010 — 2013  
*Nijmegen, NL*

## Experience

- Postdoctoral Researcher** May 2026 — now  
*Department of Programming Languages and Compilers / Eötvös Loránd University* *Budapest, HU*  
► Postdoctoral researcher with [Ambrus Kaposi](#)  on the [HOTT ERC grant](#) 
- Postdoctoral Researcher and Lecturer** May 2022 — May 2026  
*Department of Computer Science / Radboud University* *Nijmegen, NL*  
► Taught various courses (including Algorithms and Data Structures, Type Theory, and Complexity), and I worked on the formalization of (higher) category theory with a focus on the semantics of type theory.
- Research Fellow** November 2021 — February 2022  
*Department of Computer Science / University of Birmingham* *Birmingham, UK*  
► Worked with [Benedikt Ahrens](#)  and [Paige Randall North](#)  on the semantics of directed type theory, and the formalization thereof in a proof assistant.
- Lecturer** October 2021 — October 2022  
*Department of Computer Science / Radboud University* *Nijmegen, NL*  
► Worked as a lecturer on a wide variety of courses (including Operating Systems, Semantics and Rewriting, Languages and Automata, and Introduction to Formal Reasoning).

## Publications

### International Conferences

- C19. Kobe Wullaert and Niels van der Weide. *The Rezk Completion for Elementary Topoi*. Accepted at *TYPES2025 postproceedings*. DOI: [10.48550/arXiv.2601.04814](https://doi.org/10.48550/arXiv.2601.04814)
- C18. Niyousha Najmaei, Niels van der Weide, Benedikt Ahrens, and Paige Randall North. “From Semantics to Syntax: A Type Theory for Comprehension Categories”. In: *POPL 2026*. DOI: [10.1145/3776725](https://doi.org/10.1145/3776725)
- C17. Niels van der Weide. “The Internal Languages of Univalent Categories”. In: *LICS 2025*. DOI: [10.1109/LICS65433.2025.00016](https://doi.org/10.1109/LICS65433.2025.00016)
- C16. Simcha van Collem, Niels van der Weide, and Herman Geuvers. “Initial Algebras of Domains via Quotient Inductive-Inductive Types”. In: *MFPS XLI*. DOI: [10.46298/entics.16512](https://doi.org/10.46298/entics.16512)
- C15. Steven Bronsveld, Herman Geuvers, and Niels van der Weide. “Impredicative Encodings of Inductive and Coinductive Types”. In: *FSCD 2025*. DOI: [10.4230/LIPIcs.FSCD.2025.11](https://doi.org/10.4230/LIPIcs.FSCD.2025.11)

- C14. Cass Alexandru, Vikraman Choudhury, Jurriaan Rot, and Niels van der Weide. “Intrinsically Correct Sorting in Cubical Agda”. In: *CPP 2025*. DOI: [10.1145/3703595.3705873](https://doi.org/10.1145/3703595.3705873)
- C13. Nima Rasekh, Niels van der Weide, Benedikt Ahrens, and Paige Randall North. “Insights from Univalent Foundations: A Case Study Using Double Categories”. In: *CSL 2025*. DOI: [10.4230/LIPICS.CSL.2025.45](https://doi.org/10.4230/LIPICS.CSL.2025.45)
- C12. Niels van der Weide. “Univalent Enriched Categories and the Enriched Rezk Completion”. In: *FSCD 2024*. DOI: [10.4230/LIPICS.FSCD.2024.4](https://doi.org/10.4230/LIPICS.FSCD.2024.4)
- C11. Niels van der Weide and Dan Frumin. “The Interval Domain in Homotopy Type Theory”. In: *Logics and Type Systems in Theory and Practice - Essays Dedicated to Herman Geuvers on the Occasion of His 60th Birthday*. DOI: [10.1007/978-3-031-61716-4\\_16](https://doi.org/10.1007/978-3-031-61716-4_16)
- C10. Niels van der Weide, Nima Rasekh, Benedikt Ahrens, and Paige Randall North. “Univalent Double Categories”. In: *CPP 2024*. DOI: [10.1145/3636501.3636955](https://doi.org/10.1145/3636501.3636955)
- C9. Benedikt Ahrens, Ralph Matthes, Niels van der Weide, and Kobe Wullaert. “Displayed Monoidal Categories for the Semantics of Linear Logic”. In: *CPP 2024*. DOI: [10.1145/3636501.3636956](https://doi.org/10.1145/3636501.3636956)
- C8. Niels van der Weide. “The Formal Theory of Monads, Univalently”. In: *FSCD 2023*. DOI: [10.4230/LIPICS.FSCD.2023.6](https://doi.org/10.4230/LIPICS.FSCD.2023.6)
- C7. Niels van der Weide, Deivid Vale, and Cynthia Kop. “Certifying Higher-Order Polynomial Interpretations”. In: *ITP 2023*. DOI: [10.4230/LIPICS.ITP.2023.30](https://doi.org/10.4230/LIPICS.ITP.2023.30)
- C6. Benedikt Ahrens, Paige Randall North, and Niels van der Weide. “Semantics for Two-Dimensional Type Theory”. In: *LICS 2022*. DOI: [10.1145/3531130.3533334](https://doi.org/10.1145/3531130.3533334)
- C5. Niels van der Weide. “Constructing Higher Inductive Types as Groupoid Quotients”. In: *LICS 2020*. DOI: [10.1145/3373718.3394803](https://doi.org/10.1145/3373718.3394803)
- C4. Benedikt Ahrens, Dan Frumin, Marco Maggesi, and Niels van der Weide. “Bicategories in Univalent Foundations”. In: *FSCD 2019*. DOI: [10.4230/LIPICS.FSCD.2019.5](https://doi.org/10.4230/LIPICS.FSCD.2019.5)
- C3. Niccolò Veltri and Niels van der Weide. “Guarded Recursion in Agda via Sized Types”. In: *FSCD 2019*. DOI: [10.4230/LIPICS.FSCD.2019.32](https://doi.org/10.4230/LIPICS.FSCD.2019.32)
- C2. Niels van der Weide and Herman Geuvers. “The Construction of Set-Truncated Higher Inductive Types”. In: *MFPS 2019*. DOI: [10.1016/J.ENTCS.2019.09.014](https://doi.org/10.1016/J.ENTCS.2019.09.014)
- C1. Dan Frumin, Herman Geuvers, Léon Gondelman, and Niels van der Weide. “Finite Sets in Homotopy Type Theory”. In: *CPP 2018*. DOI: [10.1145/3167085](https://doi.org/10.1145/3167085)

## Journal






- J6. Niels van der Weide. *Univalent Enriched Categories and the Enriched Rezk Completion*. Accepted at *LMCS (invited special issue for FSCD 2024)*. DOI: [10.48550/ARXIV.2401.11752](https://doi.org/10.48550/ARXIV.2401.11752)
- J5. Niels van der Weide. “The Formal Theory of Monads, Univalently”. In: *LMCS (invited special issue for FSCD 2023)* 21.1 (2025). DOI: [10.46298/LMCS-21\(1:16\)2025](https://doi.org/10.46298/LMCS-21(1:16)2025)
- J4. Benedikt Ahrens, Paige Randall North, and Niels van der Weide. “Bicategorical Type Theory: Semantics and Syntax”. In: *MSCS* 33.10 (2023). DOI: [10.1017/S0960129523000312](https://doi.org/10.1017/S0960129523000312)
- J3. Benedikt Ahrens, Dan Frumin, Marco Maggesi, Niccolò Veltri, and Niels van der Weide. “Bicategories in Univalent Foundations”. In: *MSCS* 31.10 (2021). DOI: [10.1017/S0960129522000032](https://doi.org/10.1017/S0960129522000032)
- J2. Niccolò Veltri and Niels van der Weide. “Constructing Higher Inductive Types as Groupoid Quotients”. In: *LMCS* 17.2 (2021). DOI: [10.23638/LMCS-17\(2:8\)2021](https://doi.org/10.23638/LMCS-17(2:8)2021)
- J1. Henning Basold, Herman Geuvers, and Niels van der Weide. “Higher Inductive Types in Programming”. In: *JUCS* 23.1 (2017). DOI: [10.3217/jucs-023-01-0063](https://doi.org/10.3217/jucs-023-01-0063)

## Under submission

- S2. Sam Speight and Niels van der Weide. “Impredicativity in Linear Dependent Type Theory”. In: *CoRR* (2026). DOI: [10.48550/ARXIV.2602.08846](https://doi.org/10.48550/ARXIV.2602.08846)
- S1. Niels van der Weide. “The internal languages of univalent categories”. In: *CoRR* (2026). Extended version of C17. DOI: [10.48550/ARXIV.2411.06636](https://doi.org/10.48550/ARXIV.2411.06636)

## ★ Top Publications

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- T1. “[Bicategories in Univalent Foundations](#)”  (J3). This paper laid the basis for a significant part of my research since many papers of mine build forth on it. It also is my best cited publication, and it established my position in the type theory community.
- T2. “[The Internal Languages of Univalent Categories](#)”  (C17). This is my second single author publication at a flagship conference, and it presents the main results of my postdoc at Radboud University. The results in this paper are surprising and present a significant development in type theory, which is why I am deeply convinced that it has a lot of potential for interesting future research directions. This is also the paper of mine that I am most passionate about and proud of.
- T3. “[Constructing Higher Inductive Types as Groupoid Quotients](#)”  (C5). This paper presents the main research results of my PhD project, and it is my first single author publication at a flagship conference. The results of this paper are significant, and they will be relevant for many years.
- T4. “[Bicategorical Type Theory: Semantics and Syntax](#)”  (J4). An important theme in my academic work is the applications of type theory to computer science and mathematics. This paper, which is an extended version of “Semantics for Two-Dimensional Type Theory” (C6), is a nice example of this theme, because it is about a topic that has surprising application to concurrency.
- T5. “[Impredicativity in Linear Dependent Type Theory](#)”  (S2). The reason why I put this paper among my top publications, is because of its potential for future impact. Specifically, this paper is in the intersection of two important topics in theoretical computer science, namely type theory and linear logic. I am convinced that studying this combination will help finding applications for both fields, and to bring them closer together.

## Talks at International Conferences/Workshops

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### Invited talks at Workshops

*Invited talks at workshops and seminars*

- ▶ The UniMath Rocq Library (EuroProofNet Workshop on Proof Libraries, 2025)
- ▶ How to give a talk (Logic Mentoring Workshop, 2025)
- ▶ The internal languages of univalent categories (HoTTEST, 2024)
- ▶ Formalizing Double Categories in UniMath (CoREACT Meeting, 2024)
- ▶ Constructing 1-truncated finitary higher inductive types as groupoid quotients (HoTTEST, 2020)

### Invited lectures

*Invited lectures at schools*

- ▶ International School on Rewriting, 2024
- ▶ School on Univalent Mathematics, 2024
- ▶ School and Workshop on Univalent Mathematics, 2022
- ▶ School and Workshop on Univalent Mathematics, 2019

### Conferences

*Talks for published papers at conferences*

- ▶ Impredicative Encodings of Inductive and Coinductive Types (FSCD, 2025)
- ▶ Insights From Univalent Foundations: A Case Study Using Double Categories (CSL, 2025)
- ▶ Enriched Categories in Univalent Foundations (FSCD, 2024)
- ▶ Displayed Monoidal Categories for the Semantics of Linear Logic (CPP, 2024)
- ▶ The Formal Theory of Monads, Univalently (FSCD, 2023)
- ▶ Constructing Higher Inductive Types as Groupoid Quotients (LICS, 2020)
- ▶ The Construction of Set-Truncated Higher Inductive Types (MFPS, 2019)

- › Bicategories in Univalent Foundations (FSCD, 2019)

## Workshops and Seminars

### *Talks at workshops and seminars*

- › A realisability model of linear dependent type theory (DutchCATs, 2026)
- › Impredicativity in Linear Dependent Type Theory (Formath seminar, 2026)
- › Impredicativity in Linear Dependent Type Theory (LIX seminar, 2026)
- › Impredicative Encodings of Inductive and Coinductive Types (TYPES, 2025)
- › Impredicative Encodings of Inductive and Coinductive Types (DutchCATs, 2025)
- › The Univalence Maxim and Univalent Double Categories (Utrecht CT Seminar, 2024)
- › The Univalence Maxim and Univalent Double Categories (TYPES, 2024)
- › The Internal Language of Univalent Categories (Utrecht CT Seminar, 2024)
- › The Internal Language of Univalent Categories (TYPES, 2024)
- › The Interval Domain in Homotopy Type Theory (Geuversfest, 2024)
- › The Internal Language of Univalent Categories (Delft Programming Languages Seminar, 2024)
- › Certifying higher-order polynomial interpretations (Rewriting/Logic seminar, 2023)
- › Enriched Categories in Univalent Foundations (TYPES, 2023)
- › Enriched Categories in Univalent Foundations (HoTT/UF, 2023)
- › Type Formers in Directed Type Theory (DutchCATs, 2022)
- › Semantics for two-dimensional type theory (TYPES, 2022)
- › Semantics for two-dimensional type theory (Syntax and Semantics of Type Theories, 2022)
- › The correspondence between LCCCs and dependent type theories from a univalent perspective (DutchCATs, 2021)

## Academic Service

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### **PC Member**

- › Forty-Second Annual Symposium on Logic in Computer Science (LICS), 2027
- › 15th ACM SIGPLAN International Conference on Certified Programs and Proofs (CPP), 2026
- › The 31st International Conference on Types for Proofs and Programs (TYPES), 2025
- › 19th Logical and Semantic Frameworks with Applications (LSFA), 2024
- › The 4th VERSEN Workshop on Programming Languages in The Netherlands (PLNL), 2024


### **External Reviewer**

- › LICS: 2020, 2024, 2025, 2026
- › FoSSaCS: 2023, 2025
- › FSCD: 2018, 2019, 2021, 2025, 2026
- › TYPES postproceedings: 2016, 2019, 2021, 2024, 2025
- › ITP: 2025, 2026
- › MFPS: 2017, 2026
- › Logical Methods in Computer Science, Mathematical Structures in Computer Science, Journal of Pure and Applied Algebra, Advanced in Mathematics
- › Other: LPAR-22, TYPES 2018, CALCO 2019, STACS 2025, CPP 2025, POPL 2025, MFCS 2025, WoLLIC 2025, LSFA 2025


### **Organization of workshops**

- › DutchCATs, November 2023
- › DutchCATs, February 2025

### **Open Software**

- › Serving as a member of the [UniMath](#)  Coordinating Committee, I oversee and review contributions to the UniMath library.
- › I actively engage with the community on the UniMath Zulip, where I provide guidance, answer technical questions, and support members with their contributions to UniMath.

### **Other**

- › PhD examiner for Deivid Rodrigues do Vale: *On Semantical Methods for Higher-Order Complexity Analysis* (Radboud Universiteit Nijmegen, 19 April 2024)
- › Editor of the book of abstracts for [TYPES 2019](#) 

## Research Visits

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## Visiting Researcher

- › 20 days at Faculty of Mathematics and Physics, University of Ljubljana (2017, Host: Andrej Bauer)
- › 11 days at Faculty of Mathematics and Physics, University of Ljubljana (2018, Host: Andrej Bauer)
- › 4 days at Department of Mathematics and Computer Science, University of Florence (2018, Host: Marco Maggesi)
- › 3 days at Computer Science Department, IT University of Copenhagen (2019, Host: Niccolò Veltri)
- › 4 days at Department of Mathematics and Computer Science, University of Florence (2019, Host: Marco Maggesi)
- › 4 days at School of Computer Science, University of Birmingham (2019, Host: Benedikt Ahrens)
- › 10 days at Ecole Polytechnique (2026, Host: Ambroise Lafont)
- › 3 days at Department of Programming Languages and Compilers, Eötvös Loránd University (2026, Host: Ambrus Kaposi)

## € Grants

### Grant Writing

- › Assisted in writing the grant NWO project “The Power of Equality” OCENW.M20.380. PI: Herman Geuvers together with Benno van den Berg.
- › Wrote NWO XS grant “A formal study of the semantics of type theory” (not accepted).

## 👤 Teaching Experience

### Lecturer

Radboud University, Nijmegen

- › Lecturer in various bachelor courses
- ›› Semantics and Correctness (2021) | Semantics and Rewriting (2021-2025) | Complexity (2022, 2023, 2025) | Operating Systems (2020-2022, 2024, 2025) | Algorithms and Data Structures (2023-2024)
- › Lecturer in master courses
- ›› Type Theory (2018, 2022, 2024, 2025)
- › Mentoring Students in Reading Groups
- ›› MFoCS Seminar (2023-2025)

### Supervision

Radboud University, Nijmegen

- › Cosupervisor of 1 PhD student
- ›› Cass Alexandru (ongoing)
- › Daily Supervisor of 7 master students
- ›› Koen Timmermans (*Algebras of Equivalences: Defining the Integers using Equivalences in Homotopy Type Theory*), 2021
- ›› Bálint Kocsis (*Normalization for simply typed  $\lambda$ -calculus: a trilogy*), 2024
- ›› Steven Bronsveld (*Impredicative Encodings of Inductive and Coinductive Types*), 2024
- ›› David Läwen (*Coequations in Type Theory*), 2024
- ›› Simcha van Collem (*Formalizing Algebraic Effects using Domain Theory*), 2024
- ›› Tex Schönlink (*Semantics of Dependent Type Theory*), 2025
- ›› Thea Hervier (*Coequations and quotients of final coalgebras: a modal logic for delay*), 2026
- ›› Lean Ermantraut (ongoing)
- › Second reader of 3 master students
- ›› Kelley van Evert (*Realizability semantics for type theory*), 2018
- ›› Jonathan Osser (*A 2-Sketchy Approach to Type Theory*), 2025
- ›› Bas Laarakker (*A Realisability Model of Dependent Type Theory with Sizes*), 2025
- › Daily Supervisor of 4 bachelor students
- ›› Bram van Veenhoven (*Syntax and Type Checking of Truncated Type Theory*), 2023
- ›› Dick Blankvoort (*Implementing Patch Theories in Homotopy Type Theory*), 2023
- ›› Pelle Meijer (*Verifying Structural Red-Black Tree Invariants using Liquid Haskell*), 2025
- ›› Floris Reuvers (*Formalising Modal Embeddings of Call-by-Name and Call-by-Value*, 2025)

### Teaching Assistant

Radboud University, Nijmegen

- › Logic and Applications (2018-2019) | Computability Theory (2018) | Introduction to Formal Reasoning (2020) | Languages and Automata (2021)

### Qualifications

Courses completed on didactics and education

- › **Partial certificates** for UTQ competency domains “Teaching Practice” and “Thesis and Internship Supervision”
- › Completed the course “Course Design” (2023)