# Manuel Eberl

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## Personal Information

Full Name **Manuel EBERL**, IPA: [ˈmaːnu̯ɛl ˈʔeːbɐl]

ORCID **0000-0002-4263-6571**

Languages **German** (native), **English** (near-native), **Esperanto** (fluent) **Swedish** (advanced), **Spanish** (basic), **French** (basic), **Dutch** (basic)

## School Education

2001–2010 **Secondary School**, *Gymnasium Dingolfing*
Major subjects: Mathematics and Chemistry. Overall final mark: 1.0 (best possible)

1997–2001 **Primary School**, *Grundschule Altstadt, Dingolfing*

## Academic Background

since 2021 **Postdoctoral Researcher in Computer Science**, *Universität Innsbruck*

2021 **Postdoctoral Researcher in Computer Science**, *TU München*

2014–2020 **PhD in Computer Science**, *TU München*
*summa cum laude* (passed with high distinction, best possible)

2013–2016 **Bachelor of Science in Mathematics**, *TU München*,
Minor subject: Computer Science
Passed with high distinction (1.2, best possible: 1.0; $\leq$ top 10 of 223 students)

2012–2014 **Master of Science in Computer Science**, *TU München*,
Minor subject: Mathematics
Passed with high distinction (1.0, best possible; $\leq$ top 9 of 396 students)

2010–2012 **Bachelor of Science in Computer Science**, *TU München*,
Minor subject: Physics
Passed with high distinction (1.0, best possible)

2010–2014 **Fellow of the *Studienstiftung des Deutschen Volkes***
German Academic Scholarship Foundation

2006–2009 ***Jungstudium* Bachelor of Science in Computer Science**, *Fernuniversität Hagen*
early enrolment in a regular Bachelor's course

2006 ***Schülerstudium* Computer Science**, *Universität Passau*
one-semester programme for high-schools students, including regular lectures and exams from the computer science curriculum

## Technical Skills

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|---|---|
| Functional Programming | Haskell, Standard ML |
| Theorem Proving | Isabelle/HOL |
| Imperative Programming | Java, C, C++, Python, JavaScript |
| Mathematical Software | Mathematica, SageMath, MATLAB |
| Additional Experience | Smartcard programming, Android development, Microcontrollers |

## Theses

### PhD thesis (Computer Science)

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|---|---|
| Title | *Asymptotic Reasoning in a Proof Assistant* |
| Advisor | Prof Tobias Nipkow, PhD |
| Description | Various tools and applications in the Isabelle proof assistant related to asymptotics. |

### Master's thesis (Computer Science)

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|---|---|
| Title | *A Verified Compiler for Probability Density Functions* |
| Advisor | Dr Johannes Hölzl |
| Description | Verified compilation of probabilistic functional programs to density functions |

### Bachelor's thesis (Mathematics)

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|---|---|
| Title | *A Formal Proof of the Incompatibility of SD-Efficiency and SD-Strategy-Proofness* |
| Advisor | Dr Christian Geist |
| Description | Formal impossibility proof of randomised voting schemes that are anonymous, neutral, *SD*-efficient, and *SD*-strategy-proof |

### Bachelor's thesis (Computer Science)

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|---|---|
| Title | *Efficient and Verified Computation of Simulation Preorders on NFAs* |
| Advisor | Dr Peter Lammich |
| Description | Verification of an algorithm for computing the simulation relation of an automaton |

## Employment

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|---|---|
| since 2021 | **Researcher**, *Universität Innsbruck, Computational Logic Group* |
| 2014–2021 | **Researcher**, *TU München, Chair for Logic and Verification* |
| 2013–2014 | **Student Research Assistant**, *TU München, Chair for Logic and Verification*<br>Verification of efficient data structures |
| 2012–2014 | **Student Teaching Assistant**, *TU München*<br>Tutorials for *Discrete Structures*, *Functional Programming*, *Theoretical Computer Science* |
| 2010–2012 | **Working Student**, *Giesecke & Devrient*<br>Android/Smartcard Research & Development |

## Other Activities

since 2024 **Editor of the *Annals of Formalized Mathematics***

2022 **Creator and Maintainer of the *Debirdify* tool**
simplifies finding Twitter users on Mastodon and other places in the Fediverse

since 2018 **Editor of the *Archive of Formal Proofs***

October 2018 **Visiting Researcher**, *Computer Laboratory, University of Cambridge*
5 weeks

2016 **Co-organiser**, *PUMA, St. Martin in Passeier, Italy*

2015 **Co-organiser**, *PUMA/RiSE Workshop, Bad Griesbach, Germany*

2011 **Research Intern**, *Helmholtz-Zentrum Dresden–Rossendorf, Germany*
Four-week internship on the simulation of plasma physics

2010 **Software Development Intern**, *1 week*, Giesecke & Devrient, Munich, Germany

## Talks

2026 **Invited Talk**, *SMS Spring Meeting*, UniDistance, Brig, Switzerland
Title: 'Formalising Complex Analysis in Isabelle/HOL'

2025 **Invited Talk**, *EuroProofNet Symposium*, Institut Pascal, Orsay, France
Title: 'The Isabelle Archive of Formal Proofs'

2025 **Invited talk**, *Big Proof*, Isaac Newton Institute, Cambridge, UK
Title: 'Case Study: Verifying an Efficient Algorithm to Compute Bernoulli Numbers'

2023 **Invited talk**, *Formalisation of mathematics with ITPs*, Cambridge University (online)
Title: 'Some practical problems in formalising mathematics and how to solve them'

2022 **Invited Talk**, *Intercity Number Theory Seminar*, VU Amsterdam, The Netherlands
Title: 'How to Avoid Bad Points in Contour Integration, Rigorously'

2022 **Invited Talk**, *Machine-Checked Mathematics*, Leiden, The Netherlands (online)
Title: 'The Mathematical Libraries of Isabelle/HOL'

2021 **Invited Talk**, *Formal Mathematics for Mathematicians*, Timisoara, Romania (online)
Title: 'Fighting the Curse of De Bruijn'

2020 **Invited Talk**, *Formal Methods in Mathematics*, Pittsburgh, USA
Title: 'Automating Asymptotics in a Theorem Prover'

2018 **Invited Talk**, *FastRelax Meeting*, Sophia Antipolis, France
Title: 'Semi-Automatic Real Asymptotics in Isabelle/HOL'

2017 **Invited Talk**, *Linear Algebra in Isabelle/HOL Workshop*, Logroño, Spain
Title: 'Automation of Asymptotic Analysis in Isabelle/HOL'

2017 **Talk**, *Big Proof Workshop*, Automatic Asymptotics in Isabelle/HOL, Cambridge, UK
Title: 'Automation of Asymptotic Analysis in Isabelle/HOL'

2016 **Informal Talk**, *Curry Club*, Augsburg, Germany
Title: 'What is the Square Root of a Tree?'

## Awards

2022 ***Heinz Schwärtzel Dissertation Prize* for my PhD thesis**, endowed with €750

2021 **Winner of the *Proof Ground* competition at ITP 2021**

2020 **Winner of the *Proof Ground* competition at ITP 2020**

2019 **Winner of the *Proof Ground* competition at ITP 2019**
as a member of the team *Sledgehammer Squad* together with Peter Lammich

2019 **Best Paper by a Junior Researcher at FroCoS 2019**, endowed with €125
for *Verifying Randomised Social Choice*

2019 **Distinguished Student Author Award at ISSAC 2019**, endowed with $500
for *Verified Real Asymptotics in Isabelle/HOL*

2012 **Award for an excellent Bachelor's thesis**, endowed with €300
awarded by the *German Informatics Society*

2011–2014 **Member of *best.in.tum***
Programme for the best 2% of computer science students at TU Munich

2010 **Award for the school's best student in chemistry**
awarded by the *German Chemical Society*

2010 **Silver Medal at the *International Chemistry Olympiad***

2009 **Award at the German *Federal Computer Science Competition* (BWINF)**

2008 **Silver Medal at the *European Union Science Olympiad***

## Teaching

Summer 2026 **Lecturer**, Constraint Solving

Winter 2025/26 **Lecturer**, Introduction to Complexity Theory

Summer 2025 **Lecturer**, Semantics of Programming Languages

Summer 2024 **Lecturer**, Introduction to Complexity Theory

Winter 2023/24 **Lecturer**, Discrete Structures

Summer 2023 **Lecturer**, Introduction to Complexity Theory

Winter 2022/23 **Lecturer**, Discrete Structures

Winter 2022/23 **Senior Teaching Assistant**, *Theoretical Computer Science*

Summer 2022 **Senior Teaching Assistant**, *Theoretical Computer Science, Logic*

Winter 2021/22 **Senior Teaching Assistant**, *Functional Programming, Discrete Structures*

Summer 2021 **Organiser**, Seminar: *Functional Pearls*

Winter 2020/21 **Senior Teaching Assistant**, *Functional Programming and Verification*

Winter 2019/20 **Senior Teaching Assistant**, *Functional Programming and Verification*

Summer 2019 **Senior Teaching Assistant**, *Theoretical Computer Science*

Winter 2017/18 **Co-organiser**, Practical Course: *Specification and Verification*

Winter 2017/18 **Co-organiser**, Seminar: *Functional Data Structures*

Summer 2016 **Co-organiser**, Seminar: *Decision Procedures*

Winter 2014/15 **Senior Teaching Assistant**, *Functional Programming and Verification*

## Supervision

2026 **Adam Pescoller**, *Bachelor's thesis*
Arbitrary Base Numbers and Simprocs in Isabelle/HOL

2026 **Frederik Hirsch**, *Bachelor's thesis*
Verified Arbitrary-Precision Integers in Isabelle/HOL

2025 **Marcel Auer**, *Bachelor's thesis*
Multi-Modular Computation of Bernoulli Numbers on a GPU

2025 **Hannes Engl**, *Bachelor's thesis*
A SAT-based Solver for Double Choco

2025 **Jonas Linter**, *Bachelor's thesis*
Automating the Heat Plant Scheduling of a District Heating Network

2023 **David Föger**, *Bachelor's thesis*
A Web Application for Natural Deduction Proofs

2022 **Benedikt Schenk**, *Bachelor's thesis*
Finding Optimal Solutions to a Teacher Assignment Problem using MILP and SMT Solvers

2022 **Ujkan Sulejmani**, *Bachelor's thesis*
Formalisation of a Proof of the Hales–Jewett Theorem

2021 **Daniel Seidl**, *Bachelor's thesis*
Formalisation of Interval Methods for Nonlinear Root-Finding

2021 **Joseph Thommes**, *Bachelor's thesis*
Formalisation of Selected Results from Group Theory

2020 **Yecine Megdiche**, *Practical course*
Contributing to an Open Source Project: XMonad

2020 **Kristiyan Nachev**, *Bachelor's thesis*
Lazy Computation of Infinite Series

2020 **Shuwei Hu**, *Interdisciplinary project*
Verified Approximation of Integrals in Isabelle/HOL

2020 **Klaus Weidinger**, *Bachelor's thesis*
Specialized mathematical proof procedures in Isabelle/HOL

2019 **Rodrigo Raya**, *Guided research*
The Group Law for Edwards Curves

2019 **Rodrigo Raya**, *Practical course*
Specification and Verification: Gauss Sums and the Polyá–Vinogradov Inequality

2018 **Fabian Hellauer**, *Interdisciplinary project*
Field Extensions in Isabelle/HOL

2018 **Daniel Stüwe**, *Interdisciplinary project*
Formal Verification of Randomized Primality Tests

2018 **Max W. Haslbeck**, *Master's thesis*
Verification of Randomized Data Structures

2017 **Markus Großer**, *Bachelor's thesis*
Verification of Selected Efficient Algorithms in Discrete Mathematics

2017 **Jonas Keinholz**, *Practical course*
Specification and Verification: Matroids

2016 **Julian Biendarra**, *Practical course*
Specification and Verification: Bertrand's Postulate