Klaus Aehlig

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━━━ Personal Information

full name	Klaus Thomas Aehlig
date of birth	October 23, 1976
place of birth	Würzburg

━━━ Education

2005–2010   **Habilitation _in Computer Science_**, _Ludwig-Maximilians-Universität_, München
The title of the thesis was "Parallel Time and Proof Complexity".

2000–2003   **Dr. rer. nat.**, _Ludwig-Maximilians-Universität_, München, magna cum laude
PhD in Mathematics, in the area of mathematical logic. The title of thesis was "On Fragments of Analysis with Strengths of Finitely Iterated Inductive Definitions".

1996–2000   **Dipl. math. univ.**, _Ludwig-Maximilians-Universität_, München, Mit Auszeichnung
Master degree in Mathematics with distinction. The title of the thesis was "Programm-extraktion für nicht-wachsende Polynomialzeitberechnungen" (program extraction for non-size-increasing polynomial-time computations).

━━━ Work Experience

full-time

since Feb 2020   **Chief Software Build Expert**, _Huwawei Munich Research Center_, München
Original author and technical lead of an open-source build utility. `https://github.com/just-buildsystem`

2011–2020   **Software Engineer**, _Google Germany GmbH_, München
Apr 2016–Jan 2020 working on Bazel, an open-source build utility. `https://bazel.build/`
Apr 2013–Mar 2016 working on Ganeti, an open-source cluster virtual server management software tool. `http://www.ganeti.org/`

Mar–Oct, 2011   **Senior Research Assistant**, _University of Southampton_, Southampton, UK
This position was funded by the EPSRC research project "Casimir Forces in Dynamic Geometries for MEMS/NEMS Design". The research project mainly involved developing software for numeric computation of Casimir forces.

2003-2011   **Wissenschaftlicher Assistent**, _Ludwig-Maximilians-Universität_, München
Teaching and Research position.

2006–2009   **Senior Research Assistant**, _University of Wales_, Swansea, UK
This position was funded by the EPSRC research project "Abstract Measures of Low-Level Computational Complexity". Research was about proving meta-theorems about theories of Bounded Arithmetic, that is, fragments of Peano Arithmetic where the provably recursive functions form some computational complexity class.

Jan–May, 2007	**Postdoctoral Researcher**, *University of Toronto*, Toronto, Ontario, Canada Research was on relativised computational complexity classes and propositional proof complexity.
Jan–Dec, 2004	**Postdoctoral Reserarcher**, *University of Oxford*, Oxford, UK During that time, research was done on recursion scheme, i.e., simply-typed lambda-terms with fixed-point combinators.

internships and work during studies

1999-2002	**Studentische Hilfskraft**, *Ludwig-Maximilians-Universität*, München Marking homework and giving example classes.
Jul–Sep, 1999	**Internship**, *Edinburgh Parallel Computing Center*, Edingburgh, UK This internship was part of the the "EPCC Summer Scholarship Progam", working on the project "The Parallelisation of a Finite Element Code on a Shared-Memory Computer using OpenMP".
1998–1999	**Studentische Hilfskraft**, *Technische Universität*, München The programming part of the OMIS compliant monitor (where OMIS is "Online Monitoring Interface Specification"), a debugging and performance analysis tool for parallel and distributed programs.
Apr 1997	**Internship**, *gsf – Forschungszentrum für Umwelt und Gesundheit GmbH*, München

Awards and Scholarships

2008	**Invited research visit**, *Academy of Science*, Prague, Czech Republic
2007	**Postdoctoral fellowship**, *German Research Foundation (DFG)*
2004	**Postdoctoral fellowship**, *German Academic Exchange service (DAAD)*
2000–2004	**PhD scholarship**, *PhD program "Logic in Computer Science"*
1996–2000	**Scholarship**, *Studienstiftung des deutschen Volkes*
1994, 1995	**Bundessieger**, *Bundeswettbewerb Mathematik* one of the winners of the German national competition in Mathematics

Miscellaneous

languages	German (native), English (fluent), Basic knowledge of French
programming	Good knowledge in Haskell, Python, and Java from professional use. Fair knowledge in perl, C, and shell scripting from day-to-day Unix usage and administration. Knowledge of Javascript, Scheme, and ML.
other	In 2003, 2005, 2009, 2013, and 2016 I gave 17 day courses at the Deutsche Schülerakdemie (`http://www.deutsche-schuelerakademie.de/`). The topics were the lambda calculus, computation and the arithemtical hierarchy, finite automata, SAT solvers, and games on graphs, respectively.

Publications

Journal Articles

- Klaus Aehlig, Stephen Cook, Phuong Nguyen. **Relativizing Small Complexity Classes and their Theories**. Computational Complexity 25(1) 177-215, 2016.

- Jan Hoffmann, Klaus Aehlig, Martin Hofmann. **Multivariate amortized resource analysis**. ACM Transactions on Programming Languages and Systems (TOPLAS), 34(1), 2012.

- Klaus Aehlig, Florian Haftmann, Tobias Nipkow. **A compiled implementation of normalisation by evaluation**. Journal of functional programming, 22(1) (2012), 9-30.

- Klaus Aehlig, Arnold Beckmann. **On the computational complexity of cut-reduction**. Annals of Pure and Applied Logic, 161(6) (2010),711-736.

- Klaus Aehlig. **Parameter-Free Polymorphic Types**. Annals of Pure and Applied Logic, 156 (2008), 1-3.

- Klaus Aehlig. **A Finite Semantics of Simply-Typed Lambda Terms for Infinite Runs of Automata**. Logical Methods in Computer Science, 3(3:1) (2007).

- Klaus Aehlig. **Induction and Inductive Definitions in Fragments of Second Order Arithmetic**. Journal of Symbolic Logic, 70(4) (2005), 1087-1107.

- Klaus Aehlig, Jan Johannsen. **An Elementary Fragment of Second-Order Lambda Calculus**. ACM Transactions of Computational Logic, 6(2) (2005), 468-480.

- Klaus Aehlig, Felix Joachimski. **Continuous Normalization for the Lambda-Calculus and Gödel's T**. Annals of Pure and Applied Logic, 133(1-3) (2005), 39-71.

- Klaus Aehlig, Felix Joachimski. **Operational Aspects of Untyped Normalization by Evaluation**. Mathematical Structures in Computer Science, 14(4) (2004), 587-611.

- Klaus Aehlig, Ulrich Berger, Martin Hofmann, Helmut Schwichtenberg. **An arithmetic for non-size-increasing polynomial-time computation**. Theoretical Computer Science, 318 (2004), 3-27.

- Klaus Aehlig, Helmut Schwichtenberg. **A syntactical analysis of non-size-increasing polynomial time computation**. ACM Transactions on Computational Logic, 3 (2002), 383-401.

- Raimund Winkler, Klaus Aehlig. **Temporal variation of thoron decay product concentration in the atmossphere and comparision with radon decay product concentration**. Radiation and Environmental Biophysics, 37 (1998), 35-39.

Conference Articles

- Jan Hoffmann, Klaus Aehlig, Martin Hofmann. **Resource Aware ML** International Conference on Computer Aided Verification (CAV'12), 2012.

- Jan Hoffmann, Klaus Aehlig, Martin Hofmann. **Multivariate Amortized Resource Analysis** Symposium on Principles of Programming Languages (POPL '11), 2011.

- Klaus Aehlig, Florian Haftmann, Tobias Nipkow. **A Compiled Implementation of Normalization by Evaluation.** In *Proceedings of the Twentyfirst International Conference on Theorem Proving in Higher Order Logics* (TPHOLs '08). Springer Lecture Notes in Computer Science 5170 (2008), 39-54.

- Klaus Aehlig, Arnold Beckmann. **On the computational complexity of cut-reduction.** In *Proceedings of the Twentythird Annual IEEE Symposium on Logic in Computer Science* (LICS '08), 284-293.

- Klaus Aehlig, Stephen A. Cook, Phuong Nguyen. **Relativizing Small Complexity Classes and their Theories.** In Jacques Duprac and Thmoas Henzinger, editors *Proceedings of the Sixteenth Annual Conference on Computer Science and Logic* (CSL 2007). Springer Lecture Notes in Computer Science 4646 (2007), 374-388.

- Klaus Aehlig, Arnold Beckmann. **Propositional Logic for Circuit Classes.** In Jacques Duprac and Thmoas Henzinger, editors *Proceedings of the Sixteenth Annual Conference on Computer Science and Logic* (CSL 2007). Springer Lecture Notes in Computer Science 4646 (2007), 512-526.

- Andreas Abel, Klaus Aehlig, Peter Dybjer. **Normalization by Evaluation for Martin-Löf Type Theory with One Universe.** In Marcelo Fiore, editor, *Proceedings of the twenty-third Conference on the Mathematical Foundations of Programming Semantics* (MFPS 2007). Electronic Notes in Theoretical Computer Science 173 (2007), 17-39.

- Klaus Aehlig. **A Finite Semantics of Simply-Typed Lambda Terms for Infinite Runs of Automata.** In Zoltan Esik, editor, *Computer Science Logic* (CSL 2006). Springer Lecture Notes in Computer Science 4207 (2006), 104-118.

- Klaus Aehlig, Jolie G. de Miranda, C.-H. Luke Ong. **The Monadic Second Order Theory of Trees Given by Arbitrary Level-Two Recursion Schemes Is Decidable.** In Pawel Urzyczyn, editor, *Typed Lambda Calculi and Applications* (TLCA 2005). Springer Lecture notes in Computer Science 3461 (2005), 39-54.

- Klaus Aehlig, Jolie G. de Miranda, C.-H. Luke Ong. **Safety is Not a Restriction at Level 2 for String Languages**. In Vladimiro Sassone, editor, *Foundations of Software Sciences and Computation Structures* (FOSSACS 2005). Springer Lecture Notes in Computer Science 3441 (2005), 490-504.

- Klaus Aehlig, Felix Joachimski. **On Continuous Normalization**. In Julian Bradfield, editor, *Computer Science Logic* (CSL 2002). Springer Lecture Notes in Computer Science 2471 (2002), 59-73.

- Klaus Aehlig, Jan Johannsen, Helmut Schwichtenberg, and Sebastiaan A. Terwijn. **Linear ramified higher type recursion and parallel complexity**. In Reinhard Kahle, Peter Schröder-Heister, and Robert Stärk, editors, *Proof Theory in Computer Science*. Springer Lecture Notes in Computer Science 2183 (2001), 1-21.

- Klaus Aehlig, Helmut Schwichtenberg. **A Syntactical Analysis of Non-Size-Increasing Polynomial Time Computation**. Proceedings of the 5th Annual IEEE Symposium on Logic in Computer Science (LICS 2000), 84-91.

Other Publications

- Klaus Aehlig. **Parallel Time and Proof Complexity**. Habilitation thesis, University of Munich, 2010.

- Klaus Aehlig. **On Fragments of Analysis with Strengths of Finitely Iterated Inductive Definitions**. PhD thesis, University Munich, 2003.

- Klaus Aehlig. **Programmextraktion für nicht-wachsende Polynomialzeitberechnungen**. Diplomarbeit (Master thesis), University Munich, 2000.

- Klaus Aehlig. **The Parallelisation of a Finite Element Code on a Shared-Memory Computer using OpenMP**. (Final report of a project of the EPCC Summer Scholarship Programme; published as technical report of the Edinburgh Parallel Computing Center, 1999)

- Franz Ruckerbauer, Klaus Aehlig, Raimund Winkler. **Zeitaufgelöste Messung niedriger Radongaskonzentrationen**. gsf-Bericht 4/98. (Technical report of the "Institut für Strahlenschutz" of the "gsf – Forschungszentrum für Umwelt und Gesundheit GmbH" , 1998)