

# Yannick Forster

Saarland Informatics Campus E1 3


66123 Saarbrücken

✉ forster@cs.uni-saarland.de

📁 ps.uni-saarland.de/~forster

\* 13.06.1993

CV

 <https://orcid.org/0000-0002-8676-9819>

## Education

- since 10/2016 **Saarland University Programming Systems Lab**, *PhD Student under the supervision of Prof. Dr. Gert Smolka.*
- since 03/2015 **Saarbrücken Graduate School of Computer Science**, *Member of the Graduate School of Computer Science.*
- 2015–2016 **University of Cambridge, Robinson College**, *M.Phil. Advanced Computer Science, with distinction.*  
Focus on Category Theory and (Denotational) Semantics of Programming Languages. Master's thesis: "On the expressiveness of effect handlers and monadic reflection", Supervisors: Ohad Kammar and Marcelo Fiore
- 2012–2015 **Saarland University**, *B.Sc. Computer Science, Saarbrücken, Grade 1.2.*  
Minor in Mathematics. Focus on Logic, Theorem Proving, Verification and Programming Language Semantics. Bachelor's thesis: "A Formal and Constructive Theory of Computation", Supervisor: Gert Smolka
- 2012 **Gymnasium Birkenfeld**, *Abitur, Grade 1.2.*

## Publications

### Peer-reviewed Conferences

- 2021 Forster, Yannick, Fabian Kunze, Gert Smolka, Maximilian Wuttke. "A Mechanised Proof of the Time Invariance Thesis for the Weak Call-By-Value  $\lambda$ -Calculus". *12th International Conference on Interactive Theorem Proving, ITP 2021, Schloss Dagstuhl-Leibniz-Zentrum für Informatik, 2021.*
- 2021 Yannick Forster. "Church's thesis and related axioms in Coq's type theory". *29th EACSL Annual Conference on Computer Science Logic, CSL 2021, Schloss Dagstuhl-Leibniz-Zentrum für Informatik, 2021.*
- 2020 Yannick Forster, Dominik Kirst, Florian Steinberg. "Towards Extraction of Continuity Moduli in Coq" *26th International Conference on Types for Proofs and Programs, TYPES 2020.*
- 2020 Matthieu Sozeau, Simon Boulter, Yannick Forster, Nicolas Tabareau, Théo Winterhalter. "Coq Coq correct! verification of type checking and erasure for Coq, in Coq" *PACMPL 4(POPL): 8:1-8:28 (2020).*
- 2020 Yannick Forster, Fabian Kunze, Maximilian Wuttke. "Verified programming of Turing machines in Coq". *Proceedings of the 10th ACM SIGPLAN International Conference on Certified Programs and Proofs, CPP 2020.*
- 2020 Simon Spies, Yannick Forster. "Undecidability of higher-order unification formalised in Coq". *Proceedings of the 10th ACM SIGPLAN International Conference on Certified Programs and Proofs, CPP 2020.*
- 2020 Yannick Forster, Kathrin Stark. "Coq à la carte: a practical approach to modular syntax with binders". *Proceedings of the 10th ACM SIGPLAN International Conference on Certified Programs and Proofs, CPP 2020.*
- 2020 Yannick Forster, Fabian Kunze, Marc Roth. "The weak call-by-value  $\lambda$ -calculus is reasonable for both time and space". *PACMPL 4 (POPL): 27:1-27:23 (2020).*

- 2019 Yannick Forster, Dominik Kirst, Dominik Wehr. "Completeness Theorems for First-Order Logic Analysed in Constructive Type Theory". *LFCS 2020*: 47-74.
- 2019 Yannick Forster and Fabian Kunze. "A certifying extraction with time bounds from Coq to call-by-value  $\lambda$ -calculus". *International Conference on Interactive Theorem Proving, ITP 2019*, Schloss Dagstuhl-Leibniz-Zentrum für Informatik, 2021.
- 2019 Dominique Larchey-Wendling and Yannick Forster. "Hilbert's Tenth Problem in Coq". *4th International Conference on Formal Structures for Computation and Deduction (FSCD 2019)*. Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik, 2019.
- 2019 Yannick Forster, Steven Schäfer, Simon Spies, Kathrin Stark. "Call-By-Push-Value in Coq: Operational, Equational and Denotational Theory". *Proceedings of the 9th ACM SIGPLAN International Conference on Certified Programs and Proofs, CPP 2019*.
- 2019 Yannick Forster, Dominik Kirst, Gert Smolka. "On Synthetic Undecidability in Coq, with an Application to the Entscheidungsproblem". *Proceedings of the 9th ACM SIGPLAN International Conference on Certified Programs and Proofs, CPP 2019*.
- 2019 Yannick Forster and Dominique Larchey-Wendling. "Certified Undecidability of Intuitionistic Linear Logic via Binary Stack Machines and Minsky Machines". *Proceedings of the 9th ACM SIGPLAN International Conference on Certified Programs and Proofs, CPP 2019*.
- 2018 Fabian Kunze, Gert Smolka, Yannick Forster. "Formal Small-step Verification of a Call-by-value Lambda Calculus Machine". *Asian Symposium on Programming Languages and Systems*,. APLAS 2018. Springer, Cham.
- 2018 Yannick Forster, Edith Heiter, Gert Smolka. "Verification of PCP-Related Computational Reductions in Coq". *International Conference on Interactive Theorem Proving, ITP 2018*. Springer, Cham.
- 2017 Yannick Forster, Ohad Kammar, Sam Lindley, Matija Pretnar. "On the expressive power of user-defined effects: Effect handlers, monadic reflection, delimited control." *Proceedings of the ACM on Programming Languages 1*. ICFP 2017: 13.
- 2017 Yannick Forster and Gert Smolka. "Weak Call-by-Value Lambda Calculus as a Model of Computation in Coq". *International Conference on Interactive Theorem Proving, ITP 2017*. Springer, Cham.

#### Peer-reviewed Journals

- 2021 Yannick Forster, Dominik Kirst, Dominik Wehr. "Completeness Theorems for First-Order Logic Analysed in Constructive Type Theory (extended version)". *Journal of Logic and Computation* 31.1 (2021): 112-151.
- 2020 Sozeau, Matthieu, Abhishek Anand, Simon Boulier, Cyril Cohen, Yannick Forster, Fabian Kunze, Gregory Malecha, Nicolas Tabareau, and Théo Winterhalter. "The MetaCoq Project." *Journal of Automated Reasoning (2020)*: 1-53..
- 2019 Yannick Forster, Ohad Kammar, Sam Lindley, Matija Pretnar. "On the expressive power of user-defined effects: effect handlers, monadic reflection, delimited control". *Journal of Functional Programming* 29 (2019).
- 2018 Yannick Forster and Gert Smolka. "Call-by-Value Lambda Calculus as a Model of Computation in Coq". *Journal of Automated Reasoning*, 2018.

#### Peer-reviewed Workshops

- 2020 Bohdan Liesnikov, Marcel Ullrich, Yannick Forster. "Generating induction principles and subterm relations for inductive types using MetaCoq" *Coq Workshop 2020*, online.

- 2020 Yannick Forster, Dominique Larchey-Wendling, Andrej Dudenhefner, Edith Heiter, Dominik Kirst, Fabian Kunze, Gert Smolka, Simon Spies, Dominik Wehr, Maximilian Wuttke. “A Coq Library of Undecidable Problems”. *The Sixth International Workshop on Coq for Programming Languages (CoqPL 2020)*, 2020.
- 2019 Matthieu Sozeau, Yannick Forster, Simon Boulier, Nicolas Tabareau and Théo Winterhalter. “Coq Coq Codet! - Towards a Verified Toolchain for Coq in MetaCoq”. Coq Workshop 2019, Portland, USA.
- 2019 Yannick Forster and Matthieu Sozeau. “Mechanically verified type and proof erasure for Coq”. Facets of Realizability workshop 2019, Paris, France.
- 2019 Yannick Forster and Dominique Larchey-Wendling. “A constructive Coq-library for the mechanisation of undecidability”. MLA workshop 2019, Nancy, France.
- 2018 Yannick Forster and Dominique Larchey-Wendling. “Towards a library of formalised undecidable problems in Coq: The undecidability of intuitionistic linear logic”. *Syntax and Semantics of Low-Level Languages workshop, LOLA 2018*, Oxford, UK.
- 2017 Yannick Forster, Fabian Kunze, Marc Roth. “The strong invariance thesis for a lambda-calculus”. *Syntax and Semantics of Low-Level Languages workshop, LOLA 2017*, Reykjavik, Iceland.
- 2016 Yannick Forster and Fabian Kunze. “Verified Extraction from Coq to a Lambda-Calculus”. *Coq Workshop 2016*, Nancy, France.

### Pre-prints

- 2021 Yannick Forster, Felix Jahn, Gert Smolka. “A Constructive and Synthetic Theory of Reducibility: Myhill’s Isomorphism Theorem and Post’s Problem for Many-one and Truth-table Reducibility in Coq.” 2021.
- 2020 Dominique Larchey-Wendling and Yannick Forster. “Hilbert’s Tenth Problem in Coq (extended version)”. *arxiv 2006.04604*, submitted to Logical Methods in Computer Science (LMCS).

## Teaching

### At Saarland University

- Summer 2020 **Advanced Coq Programming**, *Organiser and Lecturer*, Programming Systems Lab.
- Winter 2018 **Programming 1**, *TA*, Programming Systems Lab.
- Summer 2018 **Advanced Coq Programming**, *Organiser and Lecturer*, Programming Systems Lab.
- Winter 2017 **Category Theory Seminar**, *Adviser*, Programming Systems Lab.
- Summer 2017 **Mathematics Preparatory Course for Computer Scientists**, *Organiser*, Computer Science department.
- Summer 2017 **Didactic Seminar for Student TAs in Programming 1**, *Organiser*, Reactive Systems Group.
- Summer 2017 **Category Theory Seminar**, *Adviser*, Programming Systems Lab.
- Summer 2017 **Introduction to Computational Logic**, *TA*, Programming Systems Lab.
- Summer 2016 **Mathematics Preparatory Course for Computer Scientists**, *Organiser, Lecturer and Coach*, Computer Science department.
- Winter 2016 **Seminar Functional Programming**, *Adviser*, Programming Systems Lab.
- Summer 2015 **Mathematics Preparatory Course for Computer Scientists**, *Part of the organisation team*, Computer Science department.
- Winter 2014 **Didactic Seminar for Re-exam Student TAs in Programming 1**, *Organiser*, Reactive Systems Group.

- Winter 2014 **Programming 1**, *Supervision Student TA*, Reactive Systems Group.  
Didactic and organisational support for the other TAs
- Summer 2014 **Introduction to Computational Logic**, *Student TA*, Programming Systems Lab.
- Winter 2013 **Programming 1**, *Student TA*, Dependable Systems and Software Group.
- Summer 2013 **Mathematics Preparatory Course for Computer Scientists**, *Student TA*, Computer Science department.

### Other

- 2017 **Preparatory Course in Mathematics for pupils**, *abiturma / ZEIT Schülercampus*.  
Taught two one-week courses for students in preparation of their Abitur

## Supervised Students

### Saarland University

- 2020 Felix Jahn, Bachelor's thesis. "Synthetic One-One, Many-One, and Truth-Table Reducibility in Coq"
- 2020 Marcel Ullrich, Bachelor's thesis. "Generating induction principles in MetaCoq"
- 2019 Dominik Wehr, Bachelor's thesis. "A Constructive Analysis of First-Order Completeness Theorems in Coq", co-advised with Dominik Kirst
- 2019 Simon Spies, Bachelor's thesis. "Undecidability of Higher-Order Unification in Coq"
- 2018 Maximilian Wuttke, Bachelor's thesis. "Verified Programming of Turing Machines in Coq"
- 2017 Edith Heiter, Bachelor's thesis. "Undecidability of the Post Correspondence Problem in Coq", co-supervised with Gert Smolka

## Scholarships, Awards and Honors

- 2017 **BeStE Preis**, *Saarland University*.  
Price for student initiatives and extraordinary commitment, awarded by the presidential board of the university
- 2015–2016 **Kurt Hahn Trust**, *University of Cambridge*.  
Scholarship for graduate students of German nationality at the University of Cambridge
- 2015–2016 **German Academic Exchange Service**, (*Deutscher Akademischer Auslandsdienst, DAAD*).  
Scholarship for graduate students pursuing a degree abroad
- 2014–2015 **Member of the Graduate School of Computer Science**, *Saarland University*.  
Scholarship awarded to students pursuing a PhD directly after completing their Bachelor's degree
- 2013–2016 **German National Academic Foundation**, (*Studienstiftung des deutschen Volkes*).  
Financial and academic scholarship, awarded to less than 0.5% of students in Germany
- 2015 **FdSI Bachelor Award**, *Saarland University*.  
awarded to the best Bachelor graduates in CS
- 2013–2015 **Member of the Bachelor's Honors Program**, *Saarland University*.  
special support program for talented and ambitious Bachelor students in CS
- 2012 **Award for outstanding extracurricular commitment in school**.  
awarded by the Minister of Education, Rhineland-Palatinate

## Languages

German	Native	<i>Written and spoken</i>
English	Fluent	<i>Written and spoken</i>
Spanish	Beginner	<i>Spoken</i>
French	Beginner	<i>Spoken</i>