Dominik Wagner

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Research Interests

- Probabilistic programming
- Machine learning and optimisation
- Semantics and verification programming languages

Education

DPhil (PhD) in Computer Science Oct 2018 – present
University of Oxford, Oriel College and Magdalen College, Oxford
- Supervisor: Prof. Luke Ong

MSc in Mathematics and Foundations of Computer Science Oct 2017 – Sep 2018
University of Oxford, Magdalen College, Oxford, *with Distinction*
- Thesis: **"Resolution for Higher-Order Constrained Horn Clauses"**
  Supervisor: Prof. Luke Ong

Preparatory phase of the Saarbrücken Graduate School of Computer Science May – Sep 2017
Saarland University, Saarbrücken

BSc in Computer Science (minor: Mathematics) Apr 2014 – Apr 2017
Saarland University, Saarbrücken, *Grade: 1.0 (best on a scale from 1.0 to 5.0)*
FdSI Bachelor Award for best overall performance (up to 3 recipients/semester)

Research

Publications

Carol Mak, C.-H. Luke Ong, Hugo Paquet, **Dominik Wagner**. Densities of Almost Surely Terminating Probabilistic Programs are Differentiable Almost Everywhere. In *30th European Symposium on Programming, ESOP 2021*, 2021.

Toby Cathcart Burn, Luke Ong, Steven Ramsay, **Dominik Wagner**. Initial Limit Datalog: a New Extensible Class of Decidable Constrained Horn Clauses. In *36th Annual ACM/IEEE Symposium on Logic in Computer Science, LICS 2021*, 2021.

C.-H. Luke Ong and **Dominik Wagner**. HoCHC: A refutationally complete and semantically invariant system of higher-order logic modulo theories. In *34th Annual ACM/IEEE Symposium on Logic in Computer Science, LICS 2019, Vancouver, BC, Canada, June 24-27, 2019*, 2019.

Presentations

"Almost Everywhere Differentiability of Probabilistic Programs and Applications". *DIAPASoN Seminar, University of Bologna* (remote), July 2021.

"A Taster of Probabilistic Programming and a Glimpse at Differentiability". Seminar at *Chair for Logic and Verification, Technical University Munich* (remote), June 2020.

Research and Development Experience

Applied Scientist Intern Jul – Oct 2020

Amazon Web Services (Automated Reasoning Group), Portland, OR (remote)

- Gained experience in cloud computing and AWS, especially Identity and Access Management
- Proved functional correctness of prototypical, security-critical code using the verification-aware programming language Dafny (> 3300 lines of verified code)

Student Assistant Nov 2014 – Sep 2017

Max Planck Institute for Informatics, Saarbrücken

- Development of a modern CDCL-based SAT-solver used in the ground linear arithmetic solver SPASS-SATT, which won the tracks "QF_LIA" and "Best Newcomer" in the SMT Competition 2018
- Experience in writing highly efficient C-code using debugging/profiling tools like gdb, valgrind, gprof, etc.
- Supervisor: Prof. Christoph Weidenbach

Teaching Experience

Graduate Teaching and Research Scholar Oct 2020 – present

Oriel College, Oxford

- Individualised teaching of undergraduates in very small groups (two or three students)
- Courses: Probability, Continuous Mathematics, Imperative Programming, Models of Computation

Teaching Assistant

- Lambda Calculus and Types; Automata, Logic & Games (*University of Oxford*) 2019/2020
- Fundamentals of Algorithms and Data Structures (*Saarland University*) 2016/2017

Awards and Funding (selection)

Scatcherd European Scholarship and EPSRC Doctoral Training Partnership Studentship 2018 – 2021

Scholarships covering living costs and university/college fees, respectively

FdSI Bachelor Award 2017

Best overall performance in the BSc programme of Saarland University (up to 3 recipients/semester)

Scholarship holder of the German Academic Scholarship Foundation 2015 – 2018

Financial and academic support (e.g. summer academies) of less than 0.5% of German students

Scholarship holder of the German Academic Exchange Service 2017 – 2018

Full study abroad scholarship awarded to approx 1,200 German students

Academic Service

External reviewer: LICS 2019
Student volunteer: FLoC 2018, POPL 2019, ETAPS 2019, POPL 2020

Programming Skills

Imperative languages: Java, C (*used in the implementation of a modern SAT solver*)
Functional languages: Haskell, OCaml, SML
Interactive theorem provers: Coq
Program verifiers: Dafny (*used in the internship with Amazon Web Services*)
Tools: git, gdb, valgrind, etc.

Referees

Professor C.-H. Luke Ong
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University of Oxford
Luke.Ong@cs.ox.ac.uk

Professor Andrzej Murawski
Department of Computer Science
University of Oxford
Andrzej.Murawski@cs.ox.ac.uk