

STEFFAN SØLVSTEN

PhD Student of Computer Science at Aarhus University

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A technophobic computer scientist with a flair for *formal methods* and *algorithm engineering*, and a climber, dancer, psychology and philosophy interested and board game playing hippie.

PROFESSIONAL EXPERIENCE

Academic Experience

PhD Student

Aarhus University

📅 November 2019 – March 2025 📍 Aarhus, Denmark

I have, in collaboration with my supervisor Prof. Jaco van de Pol, designed *I/O-efficient* algorithms and data structures to make Binary Decision Diagrams (BDDs) scale beyond the limits of the machine's available memory.

As part of this work, these algorithms have been implemented, evaluated, and improved upon to create a new BDD library in C++. Compared to other implementations, this work is thoroughly tested, is almost as fast or faster, and has a more generic and user-friendly API.

📄 github.com/ssoelvsten/adiar/

📄 ssoelvsten.github.io/adiar/

Industry Experience

Student Programmer

SCALGO

📅 May 2019 – October 2019 📍 Aarhus, Denmark

SCALGO brings cutting-edge massive terrain data-processing technology to market, build on more than two decades of research on I/O-efficient and geometric algorithms.

As a student developer my responsibilities was to improve and maintain the frontend of the *SCALGO Live* platform.

Software Developer

IT Minds

📅 March 2018 – April 2019 📍 Aarhus, Denmark

IT Minds provides consultancy to improve and automate the client's workflow. Among my clients have been *LEGO*, where I was working full stack and was the main architect on the frontend Angular application.

I was also the lead architect on the frontend of an internal project, where I succesfully mentored the new interns, providing feedback on their approaches to solutions and code quality.

EDUCATION

BSc in Computer Science

Aarhus University, Denmark

📅 August 2015 – June 2018

🎓 Course Average: 11.42 (A).

📄 Bachelor's Project: 12 (A+).

MSc in Computer Science

Aarhus University, Denmark

📅 August 2019 – August 2022

Master's degree obtained as part of an integrated PhD. My choice of courses focused on *algorithmics* and *formal verification*.

🎓 Course Average: 12.00 (A+).

SKILLS

Interpersonal Skills

Teaching Public speaking

Technologies

C / C++ \LaTeX SML / OCaml Java Git

Spring Boot TypeScript React

Theoretical Computer Science

Model Checking Formal Verification Logic

Functional Programming I/O Model Algorithms

Game Theory Complexity Theory

Proof Assistants Concurrency Distributed systems

Mathematics

Linear Algebra Algebra Mathematical Modelling

Mathematical Analysis

TEACHING

Teaching Assistant

Aarhus University

📅 March 2017 – August 2023

📍 Aarhus, Denmark

For a group of students, I corrected their weekly assignments and organized their weekly face-to-face lessons in which they solve the exercises provided by the course coordinator.

Computability and Logic

Algorithms and Datastructures

Regularity and Automata

Software Design using C++

Supervisor

Aarhus University

📍 Aarhus, Denmark

I have had the pleasure to supervise the following students.

- **Anna Blume Jakobsen and Mathias Weller Berg Thomasen**
📅 Summer 2020 🎓 Talent-Track Project
- **Anders Benjamin Clausen and Kent Nielsen**
📅 Spring 2022 🎓 BSc Project
- **Erik Funder Carstensen**
📅 Fall 2023 🎓 MSc Course Project

I have also managed the following student programmer.

- **Anna Blume Jakobsen**
📅 Spring 2022

INTERNATIONAL ACTIVITIES

Talks at International Events

- **2024** SPIN [1] (📅 October, 2023)
- **2023** ATVA [2] (📅 October, 2023) NFM [3] (📅 May, 2023)
- **2022** TACAS [4] (📅 April, 2022) MOVEP (📅 June, 2022)
- **2020** MFCS [5] (📅 August, 2020)

Research Visits

- **Twente University**
📅 October 2021 📍 Netherlands
Collaboration with Tom van Dijk, mapping out what to be done to integrate *Adiar* with *LTSMIn*.
- **Carnegie Mellon University**
📅 August – December 2023 📍 United States
Collaboration with Marijn Heule and Randal E. Bryant to explore applications of I/O-efficient BDDs and designing I/O-efficient LRAT proof checking.

LANGUAGES

English

Fluent – IELTS Academic: 8.0 (2019)

Danish

Native

German

Native

REFERENCES

Jaco van de Pol

@ Aarhus University

✉ jaco@cs.au.dk

PhD Supervisor

Kristoffer Arnsfelt Hansen

@ Aarhus University

✉ arnsfelt@cs.au.dk

Supervisor of a project in game theory [5]

ACADEMIC DUTIES

Peer Review

I have reviewed 5 papers for the following conferences (sorted by research area):

Algorithms and Data Structures

SEA 2023

Formal Methods

CONCUR 2021

, FMICS 2024

, TACAS 2020

, SPIN 2024

GRANTS

- **STIBOFONDEN** (IT-Rejsestipendie)

📅 February 2022

💰 40.000 DKK

PUBLICATIONS

In order of publication (newest to oldest).

Published

1. Steffan Christ Sølvsten, Casper Moldrup Rysgaard, and Jaco van de Pol.
“**Random Access on Narrow Decision Diagrams in External Memory**”.
In: *International Symposium on Model Checking Software (SPIN)*. Lecture Notes in Computer Science (LNCS). 2024.
doi:10.1007/978-3-031-66149-5_7.
2. Steffan Christ Sølvsten and Jaco van de Pol.
“**Predicting Memory Demands of BDD Operations using Maximum Graph Cuts**”.
In: *Automated Technology for Verification and Analysis*. Lecture Notes in Computer Science (LNCS). 2023.
doi:10.1007/978-3-031-45332-8_4
3. Steffan Christ Sølvsten and Jaco van de Pol.
“**Adiar 1.1: Zero-suppressed Decision Diagrams in External Memory**”.
In: *NASA Formal Methods*. Lecture Notes in Computer Science (LNCS). Vol. 13903. 2023.
doi:10.1007/978-3-031-33170-1_28
4. Steffan Christ Sølvsten, Jaco van de Pol, Anna Blume Jakobsen, and Mathias Weller Berg Thomasen.
“**Adiar: Binary Decision Diagrams in External Memory**”.
In: *Tools and Algorithms for the Construction and Analysis of Systems*. Lecture Notes in Computer Science (LNCS), Vol. 13244. 2022. doi:10.1007/978-3-030-99527-0_16.
5. Kristoffer Arnsfelt Hansen and Steffan Christ Sølvsten.
“ **\exists R-Completeness of Stationary Nash Equilibria in Perfect Information Stochastic Games**”.
In: *Mathematical Foundations of Computer Science*. Leibniz International Proceedings in Informatics (LIPIcs), Vol. 170. 2020. doi:10.4230/LIPIcs.MFCS.2020.45.
Pre-recorded Talk: youtu.be/CXC2UMi6hg0.

EXTRACURRICULAR

Kitchen Responsible

Regnecentralen, Aarhus University

📅 May 2017 – Present

Regnecentralen is a third place for students. I took care of the practical things, organised events, mediated with the university, and created social media content.

Theatrical Technician

TÅGEKAMMERETs Revy, Aarhus University

📅 December 2021 – Present

I joined on short notice to livestream the revue. Since then, I have taken care of the camera and more at the live shows.