STEFFAN SØLVSTEN

PhD Student of Computer Science at Aarhus University

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Technophobic computer scientist, climber, dancer, psychology and philosophy interested and board game playing hippie. My PhD research is at the intersection between the areas of *formal methods*, *algorithms*, and *complexity theory*.

PROFESSIONAL EXPERIENCE

Academic Experience

PhD Student

Aarhus University

November 2019 – August 2024 Aarhus, Denmark

Research in the field of Formal Verification under Prof. Jaco van de Pol. The aim of this project is to design I/O-efficient variants of the algorithms and data structures used in the field of Verification; this way we hope to scale our current techniques to encompass more real-life pieces of software and hardware.

Products of my research:

</> Adiar: BDD Manipulation in External Memory

A fully-fleshed BDD library implemented in C++ allowing one to construct and manipulate Binary Decision Diagrams, even when these vastly outgrow the memory available.

git : github.com/ssoelvsten/adiar/
: ssoelvsten.github.io/adiar/

Industrial 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 the development and maintenance of the *SCALGO Live* platform's frontend and middleware.

Software Developer

IT Minds

March 2018 – April 2019 Aarhus, Denmark

Consultant providing IT solutions, that 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 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

Graduating from Denmark's most theoretical computer science bachelor's degree.

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 · Consulting · Public speaking

Technologies

C++ · Rust · LaTeX · SML / OCaml · Java / C# · Python · Git · SQL

Spring Boot · Twisted · TypeScript · Angular · 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 – Present Aarhus, Denmark

For a group of students I corrected their weekly assingments and organized their weekly face-to-face lessons that follow the exercises provided by the course coordinator.

Courses: Computability and Logic | Algorithms and Datastructures | Regularity and Automata

Supervisor

Aarhus University

Aarhus, Denmark

I have had the opportunity to supervise students in projects related to my research project.

- **Anna Blume Jakobsen and Mathias Weller Berg Thomasen**
  In the summer after their first year on Bachelor's degree they implemented a prototype of what was to become the *Adiar* project.
- **Anders Benjamin Clausen and Kent Nielsen**
  As part of their Bachelor's project in 2022 they investigated the possibility to make a prior known algorithm for BDD variable reordering I/O-efficient.

VOLUNTEERING

I have been very active at the university outside of the studies. Below are some things I have volunteered for among other things

Kitchen Responsible

Regnecentralen, Aarhus University

May 2017 – Present Aarhus, Denmark

Regnecentralen is a kitchen and social hub for students. I took care of practical everyday things, arranged events, communication with the university, and created social media content.

Tutor

Mat/Fys-Tutorgruppen, Aarhus University

January 2016 – December 2017 Aarhus, Denmark

Planning and delivering a warm welcome first years for their first semester at the University. This included both social and university related questions.

Being in the LaTeX group, I have been the main responsible to completely redo from scratch all code producing the layout and design of their yearly songbook.

Bartender

Fredagscaféen, Aarhus University

May 2017 – Present Aarhus, Denmark

Computer Science's very own "Fredagsbar" at Aarhus University. I have been bartending two to four times every semester.

LANGUAGES

English
Fluent – IELTS Academic: 8.0 (2019)

Danish
Native

German
Native

REFERENCES

Prof. Jaco van de Pol
@ Aarhus University
jaco@cs.au.dk

PhD Supervisor

Ass. Prof. Kristoffer Arnsfelt Hansen
@ Aarhus University
arnsfelt@cs.au.dk

Supervisor of small project in game theory

PUBLICATIONS

In order of publication (newest to oldest).

Published

- 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, pp. 295–313. DOI: 10.1007/978-3-030-99527-0_16.

- Kristoffer Arnsfelt Hansen and Steffan Christ Sølvsten.
  "∃R-Completeness of Stationary Nash Equilibria in Perfect Information Stochastic Games".
  In: *45th International Symposium on Mathematical Foundations of Computer Science*. Leibniz International Proceedings in Informatics (LIPIcs), Vol. 170. 2020

In Submission

- Steffan Christ Sølvsten and Jaco van de Pol.
  "Predicting Memory Demands of BDD Operations using Maximum Graph Cuts".
  In: *Tools and Algorithms for the Construction and Analysis of Systems*. Lecture Notes in Computer Science (LNCS). 2023.

- Steffan Christ Sølvsten and Jaco van de Pol.
  "Adiar: Zero-suppressed Decision Diagrams in External Memory".
  In: *International Symposium on Formal Methods*. Lecture Notes in Computer Science (LNCS). 2023.