# STEFFAN SØLVSTEN

**PhD Student of Computer Science at Aarhus University**

@ soelvsten@proton.me  +45 24772366  Aarhus, Denmark  in /steffan-soelvsten

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: External Memory Decision Diagrams

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

git : 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

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.

- **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.
- **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.

# INTERNATIONAL ACTIVITIES

## International Events

- **MOVEP 2022**
  June, 2022  Aalborg University, Denmark

  I attended the *Summer School on Modelling and Verification of Parallel Processes* where I presented my research project during the Student Session.
- **TACAS 2022**
  April, 2022  LMU/TUM, Germany

  I presented [2] at the 29th International Conference on *Tools and Algorithms for the Construction and Analysis of Systems*.
- **MFCS 2020**
  August, 2020  Prague, Czech Republic (Zoom)

  I presented [3] at the 45th International Symposium on *Mathematical Foundations of Computer Science*. Due to COVID-19, this presentation was pre-recorded and is available *here*.

## Research Visits

- **Twente University**
  October 2021 (one week)  Netherlands

# 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

1. Steffan Christ Sølvsten and Jaco van de Pol.
   **"Adiar 1.1: Zero-suppressed Decision Diagrams in External Memory"**.
   In: *NASA Formal Methods Symposium*. Lecture Notes in Computer Science (LNCS). 2023.

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

3. 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: *35th International Conference on Computer Aided Verification*. Lecture Notes in Computer Science (LNCS). 2023.