Albert Rise Nielsen
System Architect & Algorithm Specialist

I am a System Architect with expertise in scalable software systems and computational algorithms. My experience combines advanced academic research with practical experience building high-performance applications using Rust, Python, and TypeScript. I am passionate about security, optimization, cloud architecture, and well-architected software.

CONTACT INFORMATION

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ONGOING EDUCATION

IT University of Copenhagen, Copenhagen, Denmark

Master of Science in Computer Science · **September 2023 - January 2026**

- *Master Thesis:* Implementing Maximum Flow by Augmenting Paths in $n^{2+o(1)}$ Time
- *Research Project:* Feasibility of implementing Maximum Flow and Minimum-Cost Flow in Almost-Linear Time
- *3rd semester specialisation course:* Advanced Algorithms
- *2nd semester electives:* Ethical Hacking, How to Make (Almost) Anything, Introduction to Artificial Intelligence and Linear Algebra and Probability

Bachelor of Science in Software Development · **September 2020 - July 2023**

- *Bachelor project:* Design, Implementation and Evaluation of the FlexNVMe Transport in ADIOS2
- *6th semester elective:* Algorithmic Problem Solving
- *4th semester elective:* DevOps, Software Evolution and Software Maintenance

EDUCATION

H.C. Ørsted Gymnasiet, Frederiksberg, Denmark

Upper Secondary Education, Computer Science · **August 2017 - June 2020**

- *A-level* Math and English
- *B-level* Programming

PROFESSIONAL EXPERIENCE

IAM Group, Hvidovre, Denmark

Systems Architect and consultant developer (Part-time) · **July 2025 - December 2025**

- Developed and architected a large internal event-driven system for handling data syncing between multiple external systems and internal databases. Same system also handled reporting used internally.
- Worked on customer projects as a developer optimizing the presented solution, and preparing and implementing it in their production environments.

PLATEWISE (Formerly CHANGING FOOD), Copenhagen, Denmark

System Architect (Part-time) · **March 2025 - June 2025**

- Further developed the system to be scalable using pre-calculations, aggressive caching and data processing using Polars through Rust bindings.
- Rewrote our Laravel Blade frontend into Vue with shadcn/ui, Tailwind and communication via GraphQL.

Chief Technology Officer (Part-time)   **September 2023 - March 2025**

- Developed and maintaned a system which calculates climate footprint, emissions and enviromental effects based on purchasing data, from canteens, festivals and restaurants.
- Hosted said system on AWS.
- Managed internal IT services and infrastructure through Office 365 and Azure.

Dagens, Oslo, Norway

Platform team lead (Part-time)   **August 2022 - September 2023**

- Migrated from Iterapp to Google Cloud Platform. This involved creating new infrastructure via Terraform, configuring Kubernetes services, deployments, certificates, etc. and then finally migrating DNS endpoints for each part of the platform while handling any errors resulting from the move.
- Created a new CI/CD pipeline for the platform. Greatly increasing the speed of development and deployment.
- Introduced Grafana and Prometheus for monitoring.
- Started and worked on a redesign of the platform using Domain-Driven Design. The goal was a siloed, modular architecture that would allow for easier development and maintenance. Achieved by using Event-Driven architecture with separated databases, clear interfaces and Single-Responsiblity principle. The redesign also involved a switch away from document databases towards relational databases.

Software developer (Part-time)   **December 2021 - August 2022**

- Wrote a TypeScript Object Relational Mapper (ORM) for Sanity.io, a CMS/database.
- Developed integrations with external services.
- General development of features and bug fixing.

Styrelsen for Dataforsyning og Effektivisering, Copenhagen, Denmark

Software developer (Part-time)   **October 2020 - December 2021**

- Rewrote HIP (Hydrologisk Informations Prognose System) to Vue 3
- Helped design and implement a new database design for storing image data.
- Refactored and made rs-lib a Python package.
- Developed Rust CLI tool that reduced image indexing and transfer time by 80%, processing over 250,000 images reliably. The tool could also be used to verify the integrity of the images after transfer.

Børns Vilkår, Copenhagen, Denmark

IT support and developer (Part-time)   **August 2018 - October 2020**

- Wrote a system for keeping track of donations during the country-wide fundraiser. The system was designed to sum collected amounts, by individuals, across collection methods and then provide them with a certificate. The backend was written in PHP using Laravel and the frontend was written in TypeScript with Vue.
- Designed imaging process of machines. This involved making an image with MDT, setting up infrastructure, deploying, joining Active Directory etc.
- Wrote a tool for automatically adding users to SAP Litmos, using the Microsoft Graph API. The tool was built as a platform that could leverage the Graph API to automate common tasks.
- Wrote a bunch of smaller tools in Powershell and C# to automate user creation, user administration, server maintenance etc.

Hovedstadens Svømmeklub, Copenhagen, Denmark

Training Assistant (Part-time)   **January 2016 - August 2018**

- Helped teach swimming lessons to children aged 5-10.

ACADEMIC ACHIEVEMENTS

Teachings

Applied Information Security   **July 2023 - August 2023**

- Co-taught a course on applied information security at the IT University of Copenhagen. The course was focused on practical applications of information security, including identifying security requirements, auditing existing systems, implementing security measures, and evaluating the effectiveness of those measures.
- The course was a full-time summer course, with a duration of 6 weeks.

Single lectures

- Held a single lecture on the basics of Docker, it's usage and how to use it in a development environment. YouTube link.
- Held a single lecture on the basics of Kubernetes. The course started with run through of how to use Kubernetes and why. I then covered how we used it in practice at Dagens, the challenges we faced and how we solved them.
- Guest lectured in DevOps, Software Evolution and Software Maintenance at the IT University of Copenhagen. My lecture was focused on Kubernetes and how we had previously employed it in the course.

Publications

A Holistic Advisory Tool for Sustainable Kitchens   **2025**

- Co-authored a paper on the design and implementation of a holistic advisory tool for sustainable kitchens. Heavily based on the work done at Platewise. The paper was published in ScienceDirect

FREELANCE PROJECTS

DSV, Hedehusene, Denmark

CO_2 prediction of cargo transportation   **March 2022 - August 2022**

- Developed a Proof Of Concept for predicting CO_2 emissions of cargo transportation, specifically planes.
- We used ML.net to train a regression model using data calculated based on previous flights.
- The model was incorporated into a series of web microservices that could use our, and external models.

Rollespilsfabrikken, Copenhagen, Denmark

New forum, calendar and booking system   **June 2019 - Nov 2020**

- Designed and implemented a new forum, calendar and booking system for the roleplaying community.
- The system was built from scratch with a focus on security and performance. For that, I implemented a complete RBAC (Role-based access control) system with each calendar and forum having their own permissions, which could then be combined into a role.
- The system also included a custom relevancy algorithm that combined your roles, usage and time of upload to find the best post to show on each user's front page.
- The system was built using Laravel and Vue.

VOLUNTEERING

Cafe Analog, Copenhagen, Denmark

Treasurers assistant   **April 2024 -**

- Assisting the treasurer with bookkeeping and accounting
- Redesigning the accounting system to be more user friendly
- Creating integrations between the accounting system and the cafe's POS system and app

IO member   **October 2024 -**

- Volunteer developer for the app and backend. We also developed the Spotify project for the cafe.

Volunteer barista   **September 2023 -**

- Volunteer barista for one of the highest output cafes in Copenhagen.
- I frequent the open and closing shifts. Which involve preparing the cafe for guests or cleaning up and closing everything.

Copenhagen Historic Grand Prix, Copenhagen, Denmark

Track Builder   **July 2022 - August 2022**

SKILLS   **Programming Languages**
- *Expert:* Go, PHP, Python, TypeScript, LaTeX
- *Advanced:* C#, Rust, Nix
- *Proficient:* Arduino, C, C++, Lua, Shell scripting, Java

Databases & Data Storage
- *Relational:* PostgreSQL, MySQL, SQLite
- *NoSQL:* Sanity.io
- *Query Languages:* GraphQL, SQL

Cloud & DevOps
- *Cloud Platforms:* AWS, Azure, Google Cloud, DigitalOcean
- *Containerization:* Docker, Kubernetes, Helm, Kustomize
- *CI/CD:* GitHub Actions, Azure DevOps, Dagger, Terraform
- *Monitoring:* Prometheus, Grafana, FluentD, Vector, Elastic Search, Kibana
- *Networking:* Nginx, Apache

Frameworks & Libraries
- *Frontend:* Vue, Angular, Svelte, SCSS, Tailwind CSS
- *Backend:* Laravel, Actix, Express, .NET, Echo
- *Low-level:* Boost
- *Testing:* Pest, Pytest
- *Data Processing:* Pandas, NumPy, Polars

Other technical skills
- *Version Control:* Git, GitHub
- *Operating Systems:* Linux (advanced), Windows
- *IoT & Embedded:* Arduino, Raspberry Pi
- *3D Modeling & Printing*: OpenSCAD, Autodesk Inventor, PrusaSlicer
- *BI tools*: Google Looker Studio, Apache Superset

PERSONAL   **Personal Projects & Open Source**
PROJECTS
Arch Goose Linux Distribution

- Custom Linux distribution based on NixOS focused on developer productivity
- Features include a custom desktop environment using Hyprpanel, Hyprland and Fish
- GitHub: https://github.com/albe2669/dotfiles

Spotify viewer

- A web app and backend to track and show Spotify listening
- The frontend live shows the current song and the backend stores the history
- GitHub: https://github.com/rustic-beans/spotify-viewer

Tordenkuplen.dk

- Website for generating random numbers, lists, and other randomization tools
- Used for various purposes, including games and decision-making in a High-school class
- GitHub: https://github.com/albe2669/tordenkuplen.dk

Current projects

A recipe book

- Written in Cooklang with a custom LATEXtranspiler
- Automatically transpiled and compiled using Dagger and GitHub Actions
- GitHub: https://github.com/albe2669/recipes

Band tracking

- A website for keeping track of bands I listen to, and how I got to know them.
- Can generate trees of how I got to know the bands, and how they are related using D3.js

Split keyboard

- Fine tuning the build system across multiple keyboards, layouts and tools
- Using QMK and ZMK for the firmware

COMPETETIONS **Competitive Programming**

By ITU

- Lille Kat
- Will Code for Drinks

International

- The Nordic Collegiate Programming Contest (NCPC). I've participated since 2020 and in 2023 my team and I qualified to proceed to The Northwestern Europe Programming Contest (NWERC) in Delft.
- Advent of Code
- Kattis (My profile)

Hacking

By ITU

- Will Hack for Drinks

Others

- De Danske Cybermesterskaber
- Try Hack Me (My profile)

INTERESTS **Cycling**
- I bike nearly every weekend. I ride gravel bikes, MTBs and road bikes, currently i prefer the gravel bike.
- I rebuilt my mountain bike from the ground up. Stripped an old mountain bike of all its parts and replaced all those that needed it.
- In 2022 I participated in Tour de Storebælt, the 100km version.
- In 2023 i participated in Hansens Cykelløb and Gran Fondo Storebælt.
- In 2024 i participated in Hansens Cykelløb and Bornholm Rundt.
- In 2025 i participated in Hansens Cykelløb and Bornholm Rundt.

Gaming
- Usually play with friends, currently, the most played game is Baldurs Gate 3.
- Huge fan of Factorio, the Just Cause series and Civilization.

Automation and making things

- I've built and modified a 3D printer.
- I have a keen interest in home automation, but my implementation is rather limited.
- I've built a few projects, such as a self-driving RC car, a self-flying drone with an infrared camera, a system for figuring out how many people are in different areas of a building and lights for a lego village.