Thor Olesen

Copenhagen, Denmark

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Research Interests

I am interested in Programming Languages, Computer Systems, and Quantum Computing. I previously worked as a Senior Software Engineer.

Education

University of California, Los Angeles *Los Angeles, USA*

PhD in Computer Science, (**4.0 GPA**) *2023 - 2028*

- UCLA is the best public university and the most applied to university in the world. The acceptance rate was 8% for undergraduates and **4%** for the CS PhD program in 2023 (same as Stanford, Harvard, and MIT). UCLA is top 10 in CS and **top 3** in programming languages and systems.
- My systems research is focused on programming languages, software engineering, and quantum computing under professor **Jens Palsberg**.
- **Relevant Courses:** Computer Architecture, Programming Languages, Computation, Quantum Computing, Compilers, Operating Systems.

IT University of Copenhagen *Copenhagen, Denmark*

MSc in Computer Science, Machine Learning Specialization (**3.85 GPA**) *2018 - 2020*

- **Thesis**: trained latent world models iteratively with evolutionary planning in continuous space, superior to model-free reinforcement learning.
- **UC Berkeley Exchange**: study abroad in **Fall 2018** with courses in Statistics, Data Science, and AI, resulting in letter from **Pieter Abbeel**.
- **Relevant Courses:** Advanced Machine Learning (A+), Linear Algebra & Probability (B+), Parallel Programming (A), Advanced Programming (A).

University of Copenhagen *Copenhagen, Denmark*

BSc in Computer Science *2020 - 2021*

- Completed double BSc in CS while working full-time to design languages, build compilers, and learn more deeply about computer systems.
- Built compiler for a functional programming language in F# targeting MIPS: `https://github.com/TVAO/Fasto-Compiler`.
- **Relevant Courses:** Programming Language Design (A+), Computer Systems (A), Compilers (B+).

IT University of Copenhagen *Copenhagen, Denmark*

BSc in Software Development *2014 - 2017*

- **Relevant Courses:** Distributed Systems (A+), Functional Programming (B+), Operating Systems (A), Programming Languages (B+).

Publications

Thor Olesen, Dennis Nguyen, Rasmus Berg Palm, Sebastian Risi, 2021 Evolutionary Planning In Latent Space.
In Proceedings of the 24th International Conference on the Applications of Evolutionary Computation, EvoApplications, EvoStar, 2021.

Research Experience

University of California, Los Angeles, Compilers Group *Los Angeles, USA*

Graduate Student Researcher *Fall 2023*

- Working as a GSR in the Compilers Group led by professor Jens Palsberg.
- I do research in programming languages and systems, focused on designing and implementing a high-level quantum programming language.
- I also do research on how to use machine learning to drive better static program analysis and build better software engineering tools.

IT University of Copenhagen, Robotics, Evolution & and Art Lab (REAL) *Copenhagen, Denmark*

Research Assistant *Fall 2021*

- Worked as a Research Assistant in professor **Sebastian Risi**'s REAL lab to continue thesis work in deep (model-based) reinforcement learning.
- Researched how to train latent world models in **PyTorch** iteratively using evolutionary planning, which copes with continuous action spaces.
- **Published first-author paper** showing how sample-efficient, latent world models, trained iteratively, can be combined with evolutionary planning in continuous action spaces to obtain total rewards superior to popular, model-free reinforcement learning methods (e.g., A3C, DQN).

IT University of Copenhagen *Copenhagen, Denmark*

Advanced Machine Learning *Fall 2020*

- Researched, implemented, and presented DeepMind's **DQN (Atari Breakout)** research paper with code to fellow students and examiners.
- Built **TensorFlow** agent trained on **Google Colab** to solve Atari Breakout with model-free reinforcement learning (Q-learning) and deep CNNs.

Work Experience

Google *Los Angeles, USA*

Software Engineering Intern *Summer 2024*

- I intend to do a paid summer internship at Google focused on programming languages, systems, and quantum computing.

The Org *Copenhagen, DK and NY, US*

Senior Software Engineer *Jan 2021 - April 2023*

- The Org is a public platform for companies to show off their org chart, teams, and culture to job seekers.
- Led, coordinated, and motivated a distributed data team of five people, operating asynchronously in New York and Copenhagen.
- Deployed data engineering pipeline scheduled to run hourly using **Metaflow** on **AWS Step Functions** with **NewRelic** monitoring. It automatically ingested positions and built hierarchical org charts, which led to a **10x growth** in positions (from 50K to 500K) and **100%** more traffic.
- Built recommender system in **Scala** deployed on **AWS**. It served recommendations from a **Postgres** database, which were automatically updated with daily results from AWS **Sagemaker** in **Python**. Recommendations were computed using **Matrix Factorization** on user page views (i.e., collaborative filtering) and **cosine similarities** on company features in **Numba** (i.e., content). This led to **30%** more company page views.
- Built a **Spark** job in Scala that computes interesting companies to follow using frequent pattern mining, which increased user follows by **40%**.
- Built crawler and scraper that automatically find and extracts Linkedin positions and backfilled them onto our company platform in **Metaflow**.
- Used **Bayesian Personalized Ranking** on companies followed and viewed by users in our feed to drive over **20%** more active monthly users.
- Built an **org chart builder** that automatically structured positions into a hierarchy based on their job titles. This used probabilities and graph algorithms on historical org charts to compute the likelihood of positions being managed by other positions based on their job title and industry.
- Built data pipelines that used **Fivetran** to extract and load data into **Snowflake**, **DBT** to transform the data, and **Great Expectations** to test it.
- Enabled continuous integration and deployment (CICD) to the recommender API by using **Github Actions** to automatically integrate code changes, run tests, and re-deploy it in a **Docker** container on **ECS Fargate** ("serverless", aka managed infrastructure) using **AWS Copilot CLI**.
- Deployed **computer vision model** in a **Fast API** to identify team pages. The ML workflow was created with **AWS Lambda** and **Step Functions**. Data and prediction drift was tracked in Sagemaker **model monitor**, which triggered retraining and deployment. Models were stored in a **model registry**, data in **S3**, and features in a **feature store**. Experiments were tracked in **MLflow**. Models and data were tracked in **DVC**.

Teaching

University of California, Los Angeles *Los Angeles, USA*

Teaching Assistant *2023-present*

- CS 132 Compiler Construction
- CS 238 Quantum Programming

IT University of Copenhagen *Copenhagen, Denmark*

Assistant Lecturer, Advanced Machine Learning *Fall 2021*

- Helped teach machine learning concepts, host exercise sessions, and **supervised 50+ graduate student research projects** as the head TA.

IT University of Copenhagen *Copenhagen, Denmark*

Teaching Assistant *2017-2020*

- Linear Algebra and Probability, Spring 2020
- Algorithm Design and Discrete Mathematics, Fall 2019
- Artificial Intelligence and Advanced Programming (Scala), Spring 2019
- Functional Programming (F#), Spring 2018
- Programming Languages and Distributed Systems, Fall 2017

Scholarships

In 2016, I raised over **10,000$** in scholarships to finance my stay at AUT in New Zealand. In 2018, upon visiting UC Berkeley, I managed to raise over **20,000$** from a variety of Danish private funds to pay for my stay. After coming home, I received **Peter og Emma Thomsens Legat**, which is a merit-based scholarship awarded to help and support **needy, diligent, gifted and talented** young men in Denmark during their studies. They financed me with over **1,000$ per month for the rest of my studies** so that I could focus on my courses and work less on the side. Prior to that, I had been working **6 TA jobs in parallel** to save up for my stay at **Berkeley**, while also paying for my apartment and living expenses in Denmark.

Skills

Programming	Scala, Rust, C++, Python, Go, Java, C, C#, F#, Elixir, Kotlin, JavaScript, SQL
Machine Learning	Spark, Ray, Metaflow, Pandas, Numpy, Numba, TensorFlow, PyTorch, Conda (package management)
Software Engineering	Linux, OSX, Shell, Makefile, Git, AWS, Docker, Github Actions (CICD), Newrelic (monitoring), scalafmt/pep8 (formatting)