

LUCAS FORSTER

Software Developer

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EXPERIENCE

Freelance

📅 Apr 2020 - ongoing

Full Stack Web Developer

I support clients (mid-sized companies) by developing their web applications. For greenfield projects, I assess the requirements and choose a technology stack accordingly. Existing systems are simultaneously maintained and extended based on feature requests. I always work in close communication with both the client and collaborating freelancers. This ensures timely and complete delivery.

Fraunhofer FIT

📅 Dec 2017 - Apr 2021

Student Research Assistant

My career start was in the expert group for Intelligent Mobility. The chair develops information systems for transport associations and companies. My work consisted of developing different frontend modules for these projects. Through weekly meetings everyone was involved in the overall project development. The expert group for Cooperation Systems allowed me to be personally responsible for the development of a desktop client for their new concept (see projects).

PROJECTS

Organization Platform for Event Broadcasts

Freelance

The platform covers the organizational process behind professional video broadcasts. In addition to controlling access to data, the coordination before transmissions is covered. Any changes as well as feedback are always immediately delivered via WebSockets. The backend utilizes an event sourcing approach.

Event Sourcing TypeScript React Material UI Node.js
Redis Socket.io S3 (AWS) Heroku Netlify

Management of IoT-enabled Professional Devices

Freelance

The project combines a public static website with a service area for their customers. The devices distributed are constantly transmitting data which is collected in the cloud. These are displayed in the service area for analytical and problem solving aspects. Furthermore, various support functions such as a ticket system are implemented.

TypeScript React Firebase (Google Cloud) Prismic
Gatsby SASS (CSS) Netlify

EDUCATION

Computer Science (B. Sc.) 📅 Sep 2021

RWTH Aachen University

Overall mark 2.6

- Mathematical and theoretical foundations
- Scientific research and writing
 - Low-level logic programming
 - Computer graphics
- Practical software courses (in teams)
 - Board Game AI
 - Microcontroller operating system
- Elective courses
 - Efficient Algorithms
 - Artificial Intelligence
 - Automata Theory
 - Technical English
- Physics as application subject

Final thesis on a topic in Intelligent Mobility:
Disaggregating Origin-Destination Matrices using Time-Progressive Graphs for Agent-Based Traffic Simulations

My thesis proposes a novel algorithm to generate activity schedules. To prove the concept, I applied it to a large dataset from the city of Aachen. Coping with the computational requirements needed multiple optimizations (see projects).

Published abridged version:
doi.org/10.1016/j.procs.2022.03.072

Abitur

📅 2015

Max-Planck Gymnasium Saarlouis

Overall mark 2.1

- Computer science as main subject from 8th grade onwards
- Working group Artificial Intelligence
- Final exams in mathematics, computer science, French, German, history

French Primary School

Institut de la Providence

Blockchain for Education

Fraunhofer FIT Cooperation Systems

This concept proposes a new file format for educational certificates. Their validity can be checked by a central server using blockchain. I contributed a desktop client to view, check and manage the certificates. The included HTML code had to be made resizable inside an iframe sandbox. Upon validation, a generated QR Code had to be injected into the certificate display.

Electron TypeScript React SASS (CSS)

Open Mobility Platform

Fraunhofer FIT Intelligent Mobility

The platform is used for the development, validation and documentation of protocols. The application goal was to merge the interfaces of different public transport providers. The documentation is bound to elements to achieve synchronicity with the schema. The use of the Yjs library enabled conflict-free live collaborations. My tasks were in frontend development including state management.

React Redux TypeScript Yjs MUI XSD (XML)

🔗 github.com/FIT-Mobility/interaction-protocol-suite

Disaggregating Origin-Destination Matrices

Bachelor Thesis

I applied the algorithm from my bachelor thesis to a data set from Aachen. Java was initially chosen to comply with the SDK of the traffic simulation MATSim. The search space was an undirected graph with around 170.000 nodes. To cope with memory issues, I replaced objects with primitive datatypes. The poor editability of this code led to an implementation in Rust (see link).

Rust MATSim Java Multithreading PostgreSQL

🔗 github.com/LucasForster/day-plans

Board Game AI

Bachelor Course

The objective was to develop an AI that plays a highly modified version of Reversi. Over the course of a full semester, we competed in teams of four developers. I took care of performance optimizations as well as team organization and the repository.

Java Competitive Programming Heuristic

Microcontroller Operating System

Bachelor Course

In a team of two, we developed an operating system on a microcontroller from scratch. It manages both dynamic as well as external memory. In the I/O area, we have implemented analog-digital converters as well as RFID communication.

C Atmel Studio