

# Fjalar Högnason Loodberg

[linkedin.com/in/fjalarhl](https://www.linkedin.com/in/fjalarhl) | [fjalarhognason@gmail.com](mailto:fjalarhognason@gmail.com)



## Education

### MSc. Engineering, Nanoscience

Sep 2019 - Jun 2024

Lund University

- Deeply intersectional program, covering chemistry, physics, biology, electronics, often a focus on scientific research
- Specialization in materials chemistry and nanophysics
- Used Java, C++, C, Python, and MATLAB in various mandatory and elective courses
- Master's Thesis in materials chemistry:
  - Used transmission electron microscopy (TEM) and a unique gas handling system to study new materials at the atomic scale
  - Used Python & MATLAB for processing of application-specific TEM file formats, gas handling system data, simulations

### Teacher's Assistant, Programming

Jan 2022 - Jun 2023

Lund University

- Helped students with programming exercises and assignments in Java
- Supervised study hall sessions and lab sessions
- Graded student assignments
- Cemented my own programming knowledge

### Summer Research Project

Jun 2023 - Aug 2023

Lund University

- Studied nanoparticles of multiple novel metal compounds using transmission electron microscopy & associated techniques
- Data processing using Python & MATLAB, scientific writing in L<sup>A</sup>T<sub>E</sub>X

## Personal Projects

### Raytracing/raymarching

Rust, WGSL

[gitlab.com/Fjalar/raymarching](https://gitlab.com/Fjalar/raymarching)  
[github.com/fjalar/weekend-rt](https://github.com/fjalar/weekend-rt)

- Offline software raytracer
  - No dependencies besides for RNG
  - Manual texture parsing and output serialization
  - Following the famous Raytracing in one weekend book series, translated to idiomatic Rust
- Interactive 3D raymarcher
  - Using the modern Rust graphics library WGPU, along with the WGSL shading language
  - GPU-accelerated 3D rendering engine similar to raytracing

### Fractal Explorer

C++, Rust

[gitlab.com/Fjalar/mandel](https://gitlab.com/Fjalar/mandel)  
[gitlab.com/Fjalar/bittermandel](https://gitlab.com/Fjalar/bittermandel)

- Explorable software-rendered fractals using the SDL2 framework in C++
- Later re-implemented in Rust using the Bevy game engine, the egui UI library, and GPU acceleration

### Web Games

Rust, GitHub Actions

[fjalar.github.io/2048](https://fjalar.github.io/2048)  
[fjalar.github.io/fairflips](https://fjalar.github.io/fairflips)

- Games written using the Bevy game engine in Rust, available online through continuous deployment
- Some of my work became an open source contribution to the Bevy project

## Select Courses

Programming - First Course (Java)	7.5 ECTS
Programming - Second Course (Java)	7.5 ECTS
Concurrent Programming (Java)	7.5 ECTS
C++ Programming	7.5 ECTS
Efficient C	7.5 ECTS
Memory Technology for Machine Learning	7.5 ECTS
Applied Machine Learning (Python)	7.5 ECTS

## Skills

**Programming languages:** Java, C++, C, Rust, Python, MATLAB

**Tools:** Linux, Git, GitHub CI/CD, L<sup>A</sup>T<sub>E</sub>X, Typst, Word, Excel

**Languages:** Swedish (C2), English (C2), German (B2), Icelandic (A2)