

# Willem Vanhulle



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## EXPERIENCE

### OTIV (Remote operation of semi-autonomous rail vehicles)

Mid-level software engineer

Ghent, Belgium

Apr. 2024 - June 2025

- **Distributed systems:** Built remote freight train control system with dynamic presence detection, custom async iterator toolkit, real-time connectivity monitoring with emergency breaking, and GStreamer/WebRTC video streaming.
- **Build systems & CI:** Integrated LSP with Bazel, led Bazel→Cargo migration, wrote CI/CD pipelines from scratch, optimized pipeline runtime by 95%. (Rust)
- **Language expertise:** Organized advanced Rust training on undocumented language features, performed deep technical code reviews. (Rust)

### Inbiose (Microbial production of speciality carbohydrates)

Software engineer

Ghent, Belgium

June 2021 - January 2024

- **Robotics & embedded:** Built industrial fermentation robots, interfaced with legacy hardware (25+ years) and modern sensors, migrated to async programming. (Python, Rust, C++)

## MAJOR PROFESSIONAL PROJECTS

### Emergency breaking mechanism - OTIV

Sept. 2024 - Mar. 2025

- **Real-time monitoring:** Built heartbeat system detecting connection failures between remote operators and autonomous trains.
- **Stream processing:** Designed pub-sub/TCP stream aggregator with automatic failover and emergency breaking triggers.

## HOBBY PROJECTS

**Splitting data streams:** Designed runtime-agnostic async stream combinator using low-level primitives (Waker, Poll, Pin). Published as open-source [crate](#). (Rust)

**Lean computational riddles workshop:** Created and delivered workshop on solving computational problems with theorem proving. Interactive problem-solving using dependent types and formal verification. Materials at [GitHub](#). (Lean)

**Probability arithmetic in Lean:** Developed library for simplifying probability calculations in formal mathematics. Extended real number arithmetic for probabilistic proofs. Available at [GitHub](#). (Lean)

## EDUCATION

### University of Utrecht

Summer School: Formalizing Mathematics in Lean

Utrecht, Netherlands

July 2025 - current

### KU Leuven

Master of Science in Pure Mathematics (Eng.), thesis on functional programming Jan-Sep. 2017 - June 2019

Leuven, Belgium

## HOBBIES

**Community founder:** Founder of “Systems Programming Ghent” ([sysghent.be](http://sysghent.be)): organise networking events, in-depth talks and workshops in Ghent about systems programming languages such as Rust and C++.