

Simon van Lierde

Research software engineer · Open software and data infrastructure for industrial ecology · PhD candidate, Leiden University

✉ simonvanlierde@gmail.com · 📍 The Hague, Netherlands

🌐 github.com/simonvanlierde · [linkedin.com/in/simon-van-lierde](https://www.linkedin.com/in/simon-van-lierde) · 🌐 simonvanlierde.com

PROFILE

I'm a full-stack research software engineer with three years of professional experience in software, data, and solution architecture, now halfway through a PhD in Industrial Ecology at CML, Leiden University. I lead the development of R9lab, a platform that records what products are made of, and I own it end to end. I also build dashboards and interactive visualizations so that people outside the field can read the research. My code and data are open and follow the FAIR principles (findable, accessible, interoperable, reusable).

EXPERIENCE

PhD Researcher in Industrial Ecology @ CML, Leiden University 2024 – present

- Lead developer of R9lab, responsible for the whole software lifecycle: a FastAPI/PostgreSQL backend with OAuth and Alembic migrations, React/TypeScript and Expo front-ends, CI/CD, Cloudflare networking, restic backups, and security hardening guided by OWASP ASVS.
- Ran two data-collection workshops (135 participants) and deployed the platform in a lab. By October 2026 it held 94 products, 1,779 components, and 4,455 images.
- Designed and deployed a central observability stack for CML's research software (OpenTelemetry, Grafana, OpenTofu). R9lab reports to it today.
- Built a Raspberry Pi camera plugin that captures images automatically. It has an OpenAPI spec and is released on PyPI.

Data Manager @ Nationale Milieudatabase (Dutch Environmental Database) 2023 – 2024

- Managed the environmental databases behind sustainability calculations for the Dutch construction sector. Improved their data structure, consistency, and validation, and advised on software implementation.
- Brought the national environmental databases in line with open data standards (EU LCDN, PEF), working with policymakers, developers, and industry.

Solution Architect & Product Manager @ Metabolic 2022 – 2023

- Designed tools for LCA (life-cycle assessment) and sustainability reporting. Advised the division's projects on how to apply LCA, EEIOA (environmentally extended input-output analysis), and MFA (material flow analysis).
- Product owner and domain expert for automated sustainability-reporting tools (FastAPI, Vue) that replaced static Excel models with REST APIs and web applications.

Consultant & Data Analyst, Sustainable Industries @ Metabolic 2021 – 2022

- Built environmental-impact models (LCA, MFA) in Python for sustainability consulting projects, with clients in industry, NGOs, and government.

EDUCATION

MSc Industrial Ecology @ Leiden University & TU Delft 2018 – 2023

Joint degree, specializing in environmental modeling, LCA, and GIS. My thesis used Python geoscripting to model the environmental impacts of space cooling in The Hague.

BSc Physics & Astronomy @ Radboud University 2014 – 2018

Focus on mathematics, theoretical physics, and programming. Exchange semester at the National University of Singapore.

PUBLICATIONS

Rankin, K. H., Donati, F., Tu, Q., Ward-Bond, J., Reitz, N., Hiser, B., van Lierde, S., Suh, S., Saxe, S., Posen, I. D., 2026 & Hawes, J. K. A call to ensure reproducibility of machine learning applications in industrial ecology. *Research Square* [preprint].

10.21203/rs.3.rs-9270723/v1

van Lierde, S. R9lab: data collection platform (software, v0.5.0). *Zenodo*.

2026

10.5281/zenodo.16637742

PROJECTS

R9lab github.com/CMLPlatform/r9lab

Open-source platform that records what products are made of by taking them apart, and collects the photos that computer-vision research needs.

Open-source contributions

- **lca_algebraic**: fixed sampling, method lookup and a time-zone cache bug; halved parameter expansion (0.76 s to 0.40 s) and made Sobol analysis about 20× faster without second-order indices (3.13 s to 0.16 s).
- **Brightway and pymrio**: fixed wrong LCA scores, cleared two security advisories, made importing Brightway about 0.3 s faster, and sped up pymrio's account calculation 26× (6.1 s to 0.23 s).
- **flodym**: stopped lifetime extension overwriting model parameters, and made it 9× faster (0.83 s to 0.092 s).
- **premise and Activity Browser**: fixed unreported scenario bugs in premise, and parameter, scenario-file and Monte Carlo bugs in Activity Browser.
- **Also merged**: CodeMeta, Boavizta, SchemaStore, pyOpenSci, wanderer and fastapi-mail (30 pull requests in all).

jsonvet github.com/simonvanlierde/jsonvet

Pre-commit hook and Rust library that checks JSON, JSONC, JSON5 and three other dialects, released on PyPI and crates.io. Matches the Python original on 40,228 test runs, survived a billion fuzzing inputs, up to 1,395× faster.

Public web apps simonvanlierde.com

credit-matrix, a CRediT authorship-statement tool with a Zenodo DOI, and four personal web apps, among them a multiplayer game whose one-CPU server holds about 200 rooms of 6 players under load.

RaMa-Scene explorer simonvanlierde.com/ramascene-explorer

Map of where a country's consumption causes emissions, jobs and metal-ore extraction, over a baseline and 153 RaMa-Scene scenarios on EXIOBASE (Svelte, D3). It loads under 1 MB of a 51.5 MB Parquet file by range request. Zenodo DOI.

Computer-vision taxonomy visual simonvanlierde.com/cv-ie-taxonomy

Interactive React/SVG map of computer vision in industrial ecology, drawn as an exploded teardown, for an upcoming paper.

MSc-thesis cooling dashboard simonvanlierde.com/msc-thesis-ie

A dashboard of cooling demand in The Hague and its life-cycle impacts, from my MSc thesis (Nivo, MapLibre).

TALKS & TRAINING

- Talks: Open Science Festival 2026 (lightning talk), NWO NAC 2026, Brightcon 2025, and ISIE 2025.
- Schools: BMVA Computer Vision (2026); distributed and GPU computing, Utrecht University (2026); inventory modelling at scale, Départ de Sentier (2025); AI, machine learning and neural networks, Utrecht University (2024).

SKILLS

PROGRAMMING	Python, TypeScript/JavaScript, Rust, SQL, Bash
FRONT-END	React, Svelte, Vue, Astro, Expo/React Native, D3, MapLibre, WCAG 2.2 AA (axe-core)
BACK-END	FastAPI, REST/OpenAPI, WebSockets, OAuth, PostgreSQL, Alembic
DEVOPS	Docker, GitHub Actions, OpenTofu/Terraform (IaC), Cloudflare, Grafana, uv, pnpm
PRACTICES	Git/GitHub, pytest, Playwright, benchmarking, fuzzing, PyPI and crates.io releases, reproducible workflows, FAIR (Zenodo, CodeMeta), OWASP ASVS
DATA SCIENCE & ML	PyTorch, NumPy/SciPy, Pandas, DuckDB, Parquet, Snakemake
DOMAIN MODELING	LCA (Brightway), MFA, EEIOA (EXIOBASE), GIS, circular economy
LANGUAGES	Dutch (native), English (fluent), French (B1), Chinese (A2)

INTERESTS

Multi-day treks in the mountains · Fermenting (kimchi, kombucha, tempeh) and cooking for friends · Climbing and via ferrata