Nicolas SAMELSON

Computer Engineer · Machine Learning Researcher

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📍 Ljubljana, Slovenia

As a Computer Engineering graduate from ECAM Brussels, I have developed a strong interest in AI, particularly in addressing environmental challenges. My interdisciplinary Master's thesis at the University of Auckland focused on enhancing process-based models with machine learning to improve performance in data-limited environmental settings. Concurrently, I worked on a predator detection project supporting New Zealand's Predator-Free 2050 initiative, using computer vision and deploying deep learning models in real-world conditions. I am currently contributing to a material science project at the Jožef Stefan Institute, using machine learning to model battery degradation. These experiences have honed my technical skills and reinforced my dedication to interdisciplinary research with AI and environmental science. I am now eager to pursue a PhD and contribute to innovative R&D projects that drive meaningful impact.

Education

M.Sc. in Computer Science · B.Sc. in Electronics   *Brussels, Belgium*

ECAM Brussels Engineering School   2017 – 2024

- **Master's Thesis** (Erasmus exchange at University of Auckland, New Zealand): *Machine Learning for Process-Based Environmental Modelling in Data-Limited Scenarios.*
- Developed a **hybrid model** combining process-based equations with a Variational Graph Autoencoder (**VGAE**).
- Encoded equation structures as graphs and applied word embeddings to content values, enabling latent-space comparison of environmental models.
- Aimed at improving **generalisation and transferability** of models in data-scarce scenarios.
- Applied the approach to a **soil water balance model** in collaboration with AgResearch.
- Supervisors: Jörg Wicker, Katharina Dost, Quentin Delhaye.

Professional Experience

Research Assistant   *Ljubljana, Slovenia*

Jožef Stefan Institute   Apr. 2025 – Present

- Contributed to a materials science project, in collaboration with the University of Graz, using machine learning to model degradation in solid-oxide cell-based systems.
- Investigated optimal model structures by identifying the number and configuration of circuit blocks needed to accurately simulate degradation effects.
- Supervisors: Sašo Džeroski, Pavle Boškoski, Katharina Dost

Research Assistant   *Auckland, New Zealand*

University of Auckland   Oct. 2023 – Aug. 2024

- Contributed to the **Biosecurity Technology Research** project, focusing on predator detection in support of the Predator-Free 2050 initiative.
- Developed a preprocessing pipeline using **computer vision** techniques, involving sampling frames and generating colour channels from infrared videos.
- Collaborated in developing, training, and fine-tuning a Long-term Recurrent Convolutional Network (**LRCN**) model.
- Conducted **field experiments** near Christchurch, setting up hardware and deploying the predator detection pipeline.
- Collected and analysed data on-site, troubleshooting technical issues and refining deployment strategies.
- Participated in and coordinated research seminars featuring guest speakers and internal lab talks on AI and environmental science.
- Supervisor: Katerina Taškova

Software Engineer · Student Job   *Wavre, Belgium*

MBA Mirco Belgium Application   Apr. 2023 – Aug. 2023

- Developed two internal **Python** applications integrating **Microsoft SQL** and **Google APIs**.
- Developed a tool that retrieves caller information from the database and immediately displays it to the recipient.
- Created an application that logs phone call details in Google Sheets to help with invoice generation.

Teaching Assistant · **Student Job**   *Wavre, Belgium*
Logiscool   Oct. 2022 – May 2023

- Taught programming concepts to children aged 10–14 through interactive game development projects.
- Used an internal platform blending block-based programming with a gradual transition to text-based coding.

Software Engineer · **Internship**   *Louvain-La-Neuve, Belgium*
Belighted   Mar. 2021 – May 2021

- Developed an internal tool to synchronise client data from Google Drive to Notion, in compliance with **GDPR**.
- Implemented the solution using **Ruby on Rails**, integrating **Google Drive** and **Notion APIs**.

Skills

Coding	**Python**, Node.js, GDScript, SQL, C#, C++.
ML & Data Science	**PyTorch**, NumPy, Pandas, Matplotlib, NetworkX, Scikit-learn, Jax, OpenCV.
Presentation	LaTeX, MS Office, XML, HTML, CSS.
Software & Tools	Git, VS Code, APIs, Godot, GIMP, Arduino, SLURM, Raspberry Pi, Altium Designer, MPLAB.
Field Work	Hardware setup (Nvidia Jetson), on-site deployment, data collection, iterative testing.
Soft Skills	Problem-solving, independent learning, teamwork, project coordination, academic research.
Languages	French (native), **English** (full proficiency), Dutch (beginner).

Miscellaneous Experience

Hackathons & Competitions

Global Game Jam	Developed a two-player video game using Godot in 48 hours centred on the theme *Bubbles (Antwerp, Jan. 2025)*.
Kiwi Jam	Created a 2D video game using Unity in 48 hours around the theme *Home (Auckland, Jul. 2024)*.
Advent of Code	Completed daily coding challenges throughout December *(Online, Dec. 2024)* ⌂ .

School & Personal Projects

Homelab Project	Set up and managed a homelab using Proxmox, exploring virtualisation, private cloud service, and game servers *(2023–Present)*.
3D Scanner	Built a robot integrating two cameras, a motor, and Raspberry Pis to scan and generate 3D models of objects *(ECAM Brussels, 2023)* ⌂ .
Text Recognition	Developed a full-stack application (Node.js frontend, Python backend) employing machine learning for handwritten text recognition *(ECAM Brussels, 2022)* ⌂ .

Awards

Funniest Bug	Received the **Funniest Bug** award at the **Global Game Jam** *(Antwerp, Jan. 2025)*.
Erasmus+	Awarded a 1-year scholarship for study at the University of Auckland, New Zealand *(2023–2024)*.

Interests & Hobbies

- Photography, sightseeing, and exploring nature.
- Hiking, cycling, skiing, and tennis.
- Video games, indie game development, and live music.

References

- **Jörg Wicker (University of Auckland)**, Senior Lecturer – j.wicker@auckland.ac.nz
- **Katerina Taškova (University of Auckland)**, Senior Lecturer – katerina.taskova@auckland.ac.nz
- **Quentin Delhaye (ECAM Brussels)**, Lecturer – dlh@ecam.be
- **Katharina Dost (Jožef Stefan Institute)**, MSCA Postdoctoral fellow – katharina.dost@ijs.si