

# Sylvain Estebe

Aarhus, Denmark — [sylvain.estebe@gmail.com](mailto:sylvain.estebe@gmail.com) — [GitHub](#) — [LinkedIn](#)

## Research Interests

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*Computational cognitive science, computational social science, forecasting, cultural evolution, decision-making, and behavioral ecology.*

## Education

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**Aarhus University — Aarhus, Denmark** 09/2023 – 06/2025  
*M.Sc. Cognitive Science, GPA: High Distinction (Thesis grade: A)*

- Focus on computational cognitive science and machine learning.
- Courses: Data Science, Cognitive Modeling, Natural Language Processing.
- Thesis: “Beyond Prediction: A Cognitive Model of Customer Churn” — Supervisor: Nicolas Legrand. In collaboration with Norlys.

**University of Lorraine — Nancy, France** 02/2020 – 02/2023  
*B.Sc. Mathematics & Computer Science applied to Humanities and Social Sciences, Distinction*

- Focus on applied computer science and mathematics.
- Thesis: “Quantifying Physical and Cognitive Effort in Pianists using Multi-Modal Sensor Data and Wavelet Analysis” — Supervisor: Dr. Laura Bishop.

**University of Montpellier — Montpellier, France** 02/2019 – 02/2020  
*Diploma of Access to University Studies — Sciences, Distinction*

## Research Experience

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**Center for Humanities Computing, Aarhus University — Aarhus, Denmark** 05/2025 – Present  
*Research Assistant*

- Design, implement, and validate agent-based models simulating social decision-making processes.
- Develop methods for generating and annotating synthetic data utilizing large language models.
- Draft technical documentation, survey instruments, and research manuscripts.

**Evolution & Social Cognition (ESC), ENS / Institut Jean Nicod — Paris, France** 12/2024 – 06/2025  
*Research Intern (collaboration with Nicolas Baumard)*

- Conduct computational analyses of ~24,000 French novels (1500–1999) to quantify psychological shifts in romantic love, honor, kinship obligation, religiosity, and self-exploration.
- Implement NLP pipelines: bag-of-words analysis and LLM-based annotation at scale.

**Computational Psychiatry — ILAB, Aarhus University — Aarhus, Denmark** 09/2024 – 06/2025  
*Research Intern*

- Contributed to PyHGF, an open-source JAX library for the Hierarchical Gaussian Filter (predictive coding).

**RITMO Centre / University of Oslo — Oslo, Norway** 05/2022 – 06/2024  
*Research Intern (two stays)*

- Installed and calibrated motion capture, mobile eye-tracking, and ECG setup to assess cognitive and physical effort in pianists.
- Analyzed multi-modal physiological data with wavelet analysis techniques.
- Designed experiments investigating music listening, emotional responses, and eye-tracking.

## Industry Experience

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### Norlys — Aarhus, Denmark

09/2024 – 06/2025

*Data Science Intern & Thesis Collaboration*

- Developed formal cognitive models of customer churn using Bayesian workflow methods.
- Applied unsupervised learning for customer segmentation from high-dimensional datasets.
- Presented findings to stakeholders, translating complex data into strategic recommendations.

### Self-Employed — Montpellier, France

01/2010 – 12/2021

*Music Producer & Composer*

- Produced original music tracks, managing arrangement, mixing, and mastering.
- Awarded 4 gold records (50,000+ sales each) and 1 platinum record (100,000+ sales).

## Publications

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- [3] S. Estebe, K. Enevoldsen, K. Nielbo, N. Legrand. “Robust Collective Decision-Making in Volatile Political Environments Using Quadratic Voting.” *Working paper*, 2026.
- [2] S. Estebe. “Beyond Prediction: A Cognitive Model of Customer Churn.” *Master’s Thesis, Aarhus University*, 2025.
- [1] S. Estebe. “Quantifying Physical and Cognitive Effort in Pianists using Multi-Modal Sensor Data and Wavelet Analysis.” *Bachelor’s Thesis, University of Lorraine*, 2023.

## Talks & Conferences

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- [2] S. Estebe, K. Enevoldsen, K. Nielbo, N. Legrand. “Robust Collective Decision-Making in Volatile Political Environments Using Quadratic Voting.” *neuroMONSTER 2026 — 7th International Conference on the Mathematics of Neuroscience and AI*, Rome, June 2026.
- [1] S. Estebe, N. Baumard. “Romantic Love in French Fiction (1500–1999): A Computational Behavioral Ecology Approach.” *EHBEA 2026*, Leiden, April 2026.

## Technical Skills

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**Machine Learning & NLP:** Self-supervised learning, LLM annotation pipelines (RAG), neural network architectures, NLP at scale.

**Probabilistic Modeling:** Bayesian modeling (PyMC), simulation-based inference, formal cognitive modeling, agent-based models.

**Causal Inference & Statistics:** Instrumental variable designs, conformal prediction, Hidden Markov Models.

**Technical Stack:** Python, PyTorch, JAX, PyMC, Scikit-learn, spaCy, Linux/Bash, Git, CI/CD.

**Languages:** French (native), English (fluent).

## Workshops & Summer Schools

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**Probabilistic AI Summer School, NTNU — Trondheim, Norway** 06/2025

- Advanced probabilistic programming and Bayesian inference.

**Computational Psychiatry Course, TNU — Zurich, Switzerland** 09/2024

- Translational Neuromodeling Unit, ETH Zurich.

**Similarity Judgment Workshop, Radboud University — Nijmegen, Netherlands** 09/2023 – 01/2024

- Formalized similarity judgment theory using graph theory and set theory.

**Neuromatch Deep Learning Summer School** 04/2023 – 08/2023

- Project-based curriculum: CNNs, RNNs, Transformers. Project on neural architecture robustness.

**InCommodities Hackathon — Aarhus, Denmark** 03/2025

- Developed forecasting model for European energy supply and demand.

## Community Service

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**Mentor — Danish Data Science Academy, Aarhus** 09/2025 – 06/2026

**Reviewer — Digital Humanities in the Nordic and Baltic Countries 2026** 12/2025 – 12/2026

**Teaching: Probability Theory & Statistics — Computational Humanities, Aarhus University** 12/2025 – 12/2026

**Translator — Cognijunior, neuroscience teaching kit (French translation)** 09/2020 – 09/2022

## Honours & Awards

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**EHBEA 2026 Travel Grant** 2026

**DDSA Travel Grant** 2025 – 2026

**Gold & Platinum Records — 4 gold (50k+ sales), 1 platinum (100k+ sales) as composer** 2025

## Open-Source Contributions

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**PyHGF** — Contributed to the JAX implementation of the Hierarchical Gaussian Filter for computational psychiatry. [Documentation](#)