

# Anastasia Nastya Krouglova

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Research Group: [/goncalveslab](https://goncalveslab.com)

## Research focus

PhD researcher with an interdisciplinary background in probabilistic deep learning, 3D graphics, and computational neuroscience. Expertise in simulation-based inference (subdomain of GenAI), image/signal processing, and inferring response times in perceptual decision-making models. Publication record at ICLR and NeurIPS [[portfolio](#)].

## Education

### Ph.D. in Computer Science, KU Leuven

Advisor: Prof. Pedro Gonçalves

Leuven, Belgium  
10/2023–02/2028

- Developed [MF-NPE](#), a neural parameter inference tool for high-dimensional simulators
- Multifidelity neural posterior estimation (MF-NPE) requires up to 10-100 times fewer high-fidelity simulations than current methods, as measured by C2ST, MMD and NLTP on benchmarking tasks and computationally expensive real-world simulators.
- Accomplished by doing adaptive simulation allocation and transfer learning

### M.Sc. in Computer Science (AI), VUB

Advisor: Prof. Geraint Wiggins

Brussels, Belgium  
09/2021–06/2023

Thesis: *Music Analysis Using Spectral Knowledge Representation and Reasoning* [[pdf](#)]

- Inspired by the cochlear mechanics, I applied the Fast Padé Transform (FPT) to decompose complex audio waveforms into discrete resonances
- Achieved higher precision both in time and frequency than the standard Fourier transform
- [Package](#) supports music-analysis tasks including multi-pitch estimation and note tracking

American GPA: 3.7

### Exchange program, Chalmers University

- Implemented [Screen Space Ambient Occlusion \(SSAO\)](#) to estimate the amount of hemispherical occlusion for pixels in a 3D scene

Göteborg, Sweden  
08/2022–02/2023

American GPA: 3.8

## Research experience

### Research Intern, ETH Zürich

Advisor: Prof. Ulrik Brandes

Zürich, Switzerland  
Summer 2022

Improved the Spearman's physics-based model, and Fernandez & Bonn's statistical model with physical intercepts (physics-based models in soccer analytics for pitch control estimation)

## Publication & Preprints

### 2026 **Multifidelity Simulation-based Inference for Computationally Expensive Simulators.**

[Krouglova, AN; Johnson, H; Confavreux, B; Deistler, M; Gonçalves, P.](#)

*ICLR 2026* (h-5 index: 362, h-5 median: 652): [openreview.net/forum?id=bj0dcKp9t6](https://openreview.net/forum?id=bj0dcKp9t6)

### 2025 **Inferring response times of perceptual decisions with Poisson variational autoencoders.**

[Johnson, H; Krouglova, AN; Vafaii, H.; Yates, JL; Gonçalves, P.](#)

*NeurIPS 2025 Workshop DBM Finding*: doi:[10.48550/arXiv.2511.11480](https://doi.org/10.48550/arXiv.2511.11480)

### 2025 **Memory by a thousand rules: Automated discovery of multi-type plasticity rules reveals variety & degeneracy at the heart of learning.**

[Confavreux, B; Harrington, Z; ...; Krouglova, AN; Bozelos, P; Macke, JH; Saxe, A; Gonçalves, P; Vogels, T.](#)

*BioRxiv*: doi:[10.1101/2025.05.28.656584](https://doi.org/10.1101/2025.05.28.656584)

### 2025 **sbi reloaded: a toolkit for simulation-based inference workflows.**

[Boelts, J; Deistler, M; Gloeckler, M; ...; Krouglova, AN; ...; Greenberg, DS; Gonçalves, P; Macke, JH;](#)

*JOSS*: doi:[10.21105/joss.07754](https://doi.org/10.21105/joss.07754) | Open science: [sbi-dev/sbi](https://github.com/sbi-dev/sbi)

## Open-Source Research Software

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- 2025-on **mf-npe: toolkit for multifidelity sbi in PyTorch** | [🔗 goncalab/multifidelity-NPE](#)  
*MF-NPE: multifidelity simulation-based inference for computationally expensive simulators.*  
Role: Maintainer
- 2024-on **sbi: toolkit for simulation-based inference in PyTorch** | [🔗 sbi/latest](#)  
*Stats: Affiliated with NumFocus, 765 stars on GitHub, 150 daily downloads on PyPI, 417 citations.*  
Role: Contributor, since 2024
- 2023 **Spectral Knowledge Representation and Reasoning** | [🔗 Master-Thesis](#)  
*Toolbox for extracting musical structures using non-orthogonal bases in a Hilbert Space.*  
Role: Maintainer

## Summer schools & teaching

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- Student**, Cajal, Champalimaud Centre for the Unknown, Portugal Summer 2025  
*3-week summer school on AI and Neuroscience (24 participants worldwide, highly selective)*
- Teaching Assistant**, SBI Workshop, Rhine Valley, Germany Mar 2024  
*Supervision of PhD students and Postdoctoral researchers on SBI.*

## Awards

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- 2025 **Scientific Poster Competition** (VIB-KU Leuven CBD Science Day).
- 2024 **Best poster presentation** (Multifidelity simulation-based inference; NERF Retreat).

## Community service & outreach

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- 2026 **Student Volunteer at SIGGRAPH 2026**
- 2024-on **PhD representative at NERF-CBD and VIB.AI**  
*Organizer of:*
- *OB conference for PhD students from UCL (London), VIB (Belgium) and NTNU (Norway) [info]*
  - *Institutional events across three VIB centers (international dinners, external speaker seminars,...)*
- 2024-on **Master's students supervision:** Merel Haenraets (Efficient inference over neuron morphologies), Matties Roofthoof (active inference with continuous fidelities), Arno Genicot (Flow matching for SBI)

## Selected Invited Talks

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- 2026 COSYNE conference, Lisbon, Portugal (Top 2.5% of submissions)
- 2025 SBI Hackathon University of Tübingen/International Max-Planck Research School for Intelligent Systems, Germany
- 2025 BrIAS seminar, VUB AI Lab, Brussels
- 2024 CBD/NERF seminar, KU Leuven, Leuven

## Skills

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**Programming:** Python (PyTorch, JAX, NumPy, SciPy), JavaScript, Julia, Matlab, C++

**Technical:** Simulation-based inference, Normalizing Flows, Signal/Image Processing, 3D modelling

**Scientific:** Models of Perception, Generative AI, Probabilistic ML, Bayesian Inference, Computational Neuroscience, Computer Graphics

## Languages

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**Dutch:** Native   **Russian:** Native   **English:** C2   **French:** B2

## Beyond Science

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- 2017-on **Classical and Jazz Piano teacher** (+12 years of practice) [\[album\]](#)
- 2013-on **Figure skater & Coach/Choreographer** (National Champion in 2018)