Anastasia Nastya Krouglova

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Research focus

PhD researcher with an interdisciplinary background in probabilistic deep learning, 3D graphics, and computational neuroscience. 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
Thesis: Music Analysis Using Spectral Knowledge Representation and Reasoning [pdf]
Brussels, Belgium
09/2021–06/2023

- 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
Göteborg, Sweden
08/2022–02/2023

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

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

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

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

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 | Open science: sbi-dev/sbi

Open-Source Research Software

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

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

2025 **Scientific Poster Competition** (VIB-KU Leuven CBD Science Day).

2024 **Best poster presentation** (Multifidelity simulation-based inference; NERF Retreat).

Community service & outreach

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 Roofthooft (active inference with continuous fidelities), Arno Genicot (Flow matching for SBI)

Selected Invited Talks

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

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

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

Beyond Science

2017–on **Classical and Jazz Piano teacher** (+12 years of practice) [album]

2013–on **Figure skater & Coach/Choreographer** (National Champion in 2018)