Jens Egholm Pedersen

Born: 1988, Denmark

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Education

2019-2025 (est.) **PhD in Computer Science**, KTH Royal Institute of Technology, Sweden.
Thesis: **Neuromorphic computing in space and time**.
Advisors: Jörg Conradt (KTH) and Arvind Kumar (KTH, Karolinska Institute).
Research stay: Stanford University, supervised by Sadasivan Shankar.

2016-2019 **MSc in IT & Cognition**, University of Copenhagen.
Thesis: Modelling learning systems in spiking and artificial neural networks.

2011-2015 **BSc in Computer Science**, IT-University of Copenhagen.
Thesis: Predictable firm real-time Java. In collaboration with CERN.

2009-2011 **BSc in Political Science**, University of Aarhus, Denmark.
Thesis: Proxy voting in the European Union.

Peer-reviewed publications (* indicates equal authorship)

2025 **J. E. Pedersen**, J. Conradt, & T. Lindeberg. "Covariant spatio-temporal receptive fields for neuromorphic computing". *In review.*

2025 J. P. Romero B., D. Korakovounis, **J. E. Pedersen**, J. Conradt. "Closed-loop neuromorphic air hockey player with millisecond reaction time". *In review.*

2024 **J. E. Pedersen***, S. Abreau*, J. Eshraghian, et al. "The Neuromorphic Intermediate Representation". Nature Communications [IF: 17.69].

2024 S. Abreau*, **J. E. Pedersen***, K. Heckel*, & A. Pierro. "Q-S5: Towards Quantized State Space Models." ICML - Next Generation of Sequence Modeling Architectures [Acceptance rate: 30.5%].

2024 S. Abreau, **J. E. Pedersen**. "Neuromorphic Programming: Emerging Directions for Brain-Inspired Hardware". International Conference on Neuromorphic Computing Systems.

2024 A. Geminiani, J. Kathrein, ..., **J. E. Pedersen** et al. "Multidisciplinary and collaborative training in neuroscience: Insights from the Human Brain Project Education Programme". Neuroinformatics [IF: 2.7].

2023 **J. E. Pedersen**, R. Singhal, & J. Conradt. "Translation and Scale Invariance for Event-Based Object tracking". Neuro Inspired Computational Elements Conference (NICE).

2023 **J. E. Pedersen** & J. Conradt. "AEStream: Accelerated event-based processing with coroutines." Neuro Inspired Computational Elements Conference (NICE).

2023 J. P. Romero B., L. A. Plana, A. Rowley, M. Hessel, **J. E. Pedersen**, S. Furber, J. Conradt. "A High-Throughput Low-Latency Interface Board for SpiNNaker-in-the-loop Real-Time Systems." ICONS - International Conference on Neuromorphic Systems.

2018 J. Mogensen, N. Dauggaard, S. Kitsios, **J. E. Pedersen**, M. Overgaard. "Understanding the neurocognitive organization as strategies rather than functions: Implications for neurological research." *EC Neurology.*

Open-access publications (* indicates equal authorship)

2024 **J. E. Pedersen**, R. Singhal, & J. Conradt, "Event dataset generation for Galilean and affine transformations". Zenodo.

2022 **J. E. Pedersen**, J. P. Romero B. & J. Conradt, "Coordinate regression with Spiking Neural Networks." Workshop on Neuromorphic Algorithms.

2022 J. Turner, **J. E. Pedersen**, J. Conradt, & T Nowotny, "Event-based dataset for classification and pose estimation." Neuro Inspired Computational Elements Conference (NICE).

2020 **J. E. Pedersen***, C. Pehle*, "Norse - Spiking neural network for deep learning." Zenodo.

Honours, Grants & awards

2025 Mahowald Early Career Award for work on the Neuromorphic Intermediate Representation.
2024 NSF AccelNet NeuroPAC Fellowship with Professor Sadasivan Shankar, Stanford University.
2022 - 2025 Compute grant for Swedish National Infrastructure

Select appointments held

2018-2025 **External lecturer**, IT-University of Copenhagen, Denmark
I planned and taught courses on Python and data science with outstanding reviews.
2016-2019 **Adjunct professor**, Copenhagen Business Academy, Denmark
I lectured on machine learning, artificial intelligence, business analytics and distributed systems infrastructure with outstanding reviews.
2016-2019 **Chief Technology Officer**, Mobilized Construction, Denmark, Kenya
I designed a globally distributed software stack, managed teams in the US, Wales, Kazaksthan, and Kenya, and supervised projects from several universities.
2014-2016 **Software engineer**, CERN, Switzerland
I developed and maintained a monitoring toolchain and testbed for the Large Hadron Collider.

Select talks

2025 Reproducibility and interoperability in neuromorphic computing — Nengo Summer School.
2024 NIR: A unified instruction set for brain-inspired computing — Telluride Neuromorphic Cognition Engineering Workshop and Spiking Neural networks as Universal Function Approximators
2023 AEStream: Accelerated event-based processing with coroutines — Telluride Neuromorphic Cognition Engineering Workshop.
2023 Translation and Scale Invariance for Event-Based Object tracking — Neuro Inspired Computational Elements Conference (NICE).
2023 The need for neuromorphic abstractions — Open Neuromorphic workshop.
2021 Norse: A library for gradient-based learning in Spiking Neural Networks — Workshop on Spiking Neural networks as Universal Function Approximators (SNUFA).

Selected student projects

2024 Oskar Strömberg, *Event-based vision with spiking vision transformers*, KTH, MSc.
2022 Philpp Mondorff, *Spiking Reinforcement Learning for Robust Robot Control*, KTH, MSc.
2022 Merlin Sewina, *Decoding EEG with Spiking and Artificial Neural Networks*, KTH, MSc.
2020 Mikkel Ziemer, *Building CERN's Control System*, CPHBusiness, BSc.

Contributions to the community

I review for several neuromorphic venues, including the Journal of Neuromorphic Computing and Engineering, the Neuro Inspired Computational Elements Conference (NICE), and the International Conference on Neuromorphic Systems (ICONS). I have organized and led numerous events including at the Telluride Neuromorphic Cognition Engineering Workshop and CapoCaccia Workshop toward Neuromorphic Intelligence. Finally, I am an active part of the *Open Neuromorphic Community* and I am driving development of Faery, AEstream, and Norse.

Technical training

Teaching: Supervision, Communication, and Teaching.
Courseworks: Advanced machine learning, Deep neural networks, Computational Neuroscience, Advanced Computer vision.
Programming: Python, C++, C, Rust, CUDA, PyTorch, JAX, NumPy, SciPy.
Software Engineering: Git, Docker, Linux, DevOps, NixOS, CI/CD, Testing, Documentation.