BOJIAN YIN

Deep Learning ◇ Brain-Inspired Intelligence ◇ Foundational AI
yinbojian93@gmail.com

PROFILE

Machine learning researcher with a strong mathematical foundation and a track record of **original, high-impact research**, including **two first-author papers in Nature Machine Intelligence**. My work spans **brain-inspired learning, novel training algorithms, and modern deep learning architectures** (transformers, state-space models, and recurrent networks), centered on the mathematical mechanisms of intelligent learning. I enjoy **initiating and owning research agendas**, collaborating across disciplines, and turning new ideas into rigorous methods and peer-reviewed publications. Proficient in **Python (PyTorch, JAX)**.

RESEARCH EXPERIENCE

Associate Researcher at the Institute of Automation, Chinese Academy of Sciences *Nov 2025 - Present*
Researching brain-inspired intelligence and foundational AI, integrating mathematical insight, biological inspiration, and system design.

- Mathematical mechanisms of learning and generalization
- Brain-inspired models and scalable AI architectures
- Efficient and adaptive algorithms for next-generation AI

Postdoctoral Researcher at Eindhoven University of Technology *Sep 2024 - Oct 2025*
Developed mathematically principled algorithms for efficient training and inference, spanning sequence models and on-chip learning for embedded and neuromorphic platforms.

- Designed sparse selective-update RNNs for long-range sequence modeling
- Developed local, scalable alternatives to backpropagation (variational propagation)
- Formulated a continual-inference framework for RNNs without state resets

Senior Neuromorphic Engineer at Innatera Nanosystems B.V., Delft *Mar 2023 - Sep 2024*
Designed and optimized learning algorithms for analog and digital neuromorphic hardware; led algorithm research, IP filing, and hardware/software co-design.

- Built radar-based human-presence detection on a neuromorphic chip
- Optimized the SDK and deployment tooling for production
- Validated prototypes on edge platforms

Researcher at CWI[1], Amsterdam *Sep 2022 - Mar 2023*
Led algorithm design, application development, and hardware deployment (mobile, FPGA) in the "Perceptive Acting Under Uncertainty" project; supervised PhD and postdoctoral researchers.

- Developed efficient uncertainty estimation for neural-network predictions

PhD Candidate at CWI, Amsterdam
Researcher at imec, Eindhoven *Sep 2018 - Sep 2022*
Advanced brain-inspired algorithms, particularly Spiking Neural Networks (SNNs), with Prof. Sander Bohte and Federico Corradi, resulting in two publications in **Nature Machine Intelligence**. Also worked on transformers, CNNs, and state-space models:

- Developed state-of-the-art online learning rules for SNNs/RNNs
- Built robust, energy-efficient SNNs/RNNs under tight resource constraints
- Improved CNN robustness to additive noise; designed contrastive GAN variants

[1] Centrum Wiskunde & Informatica (CWI), the Dutch National Research Institute for Mathematics and Computer Science

Research Assistant at CWI, Amsterdam *Sep 2017 - Sep 2018*
Applied deep learning to detect and localize ALS-causative genes in large-scale whole-genome sequences for early detection (Project MinE).

Master's Thesis Internship at CWI, Amsterdam *Mar 2017 - Sep 2017*
Investigated computer-vision methods to learn spatial embeddings of DNA sequences for detecting histone occupancy and modifications.

EDUCATION

Eindhoven University of Technology *Sep 2018 - Dec 2022*
PhD in Electrical Engineering *Daily work at CWI, Amsterdam*
Topic: Efficient and Effective Spiking Neural Networks on Neuromorphic Chips

Vrije Universiteit Amsterdam *Sep 2015 - Sep 2017*
MSc in Artificial Intelligence (joint program with UvA) GPA 3.9/4.0
Thesis: An image representation-based convolutional network for DNA classification

North China Electric Power University *Sep 2014 - Jul 2015*
MSc in Computational Mathematics GPA 3.8/4.0

Tangshan Normal University *Sep 2010 - Sep 2014*
BSc in Information and Computer Science GPA 3.75/4.0
Thesis: Applying Neural Networks to DNA Sequence Classification

SKILLS

Research Methods
Deep learning (Transformers, State-Space Models, RNNs, CNNs), sequence and time-series modeling, Bayesian and uncertainty estimation, mathematical statistics, large-scale noisy data analysis
Programming Languages and Frameworks
Advanced: Python (PyTorch, JAX, TensorFlow, Keras), C/C++, Matlab, SQL, Bash
Working knowledge: Java, JavaScript, R
Platforms/Tools: FPGA deployment, embedded Linux, neuromorphic SDKs

FUNDING AND GRANTS

NSFC Excellent Young Scientists Fund (Overseas) *2024*
Highly competitive national grant awarded to approximately the top 5% of applicants.

PATENTS

Method to build and deploy spiking neural networks on a hardware device *Jul 2023*
Patent application no. 32479.0021.USV0

AWARDS AND SCHOLARSHIPS

Student Travel Award, ICLR 2018 *2018*
First-grade Grant for Graduates awarded by NCEPU *2014*
Top 10% in the department
National Motivational Scholarship *2013*
Top 2% in the department
Second Prize, Chinese Undergraduate Mathematics Olympic Contest *2013*
Province-wide

PAPERS

[1]. **Yin, B.**, Corradi, F., Bohte, S.M. Accurate and efficient time-domain classification with adaptive spiking recurrent neural networks. ***Nature Machine Intelligence*** *3, pp. 905-913 (2021)*.

[2]. **Yin, B.**, Corradi, F., Bohte, S.M. Accurate online training of dynamical spiking neural networks through Forward Propagation Through Time. ***Nature Machine Intelligence*** *5, 518527 (2023)*.

[3]. **Yin, B.**, Corradi, F. Efficient Sparse Selective-Update RNNs for Long-Range Sequence Modeling. arXiv preprint. (2026, under review)

[4]. Pes, L., **Yin, B.**, Stuijk, S., Corradi, F. Traces propagation: memory-efficient and scalable forward-only learning in spiking neural networks. Neuromorphic Computing and Engineering. (2025)

[5]. **Yin, B.**, Corradi, F. Stochastic Variational Propagation: Local, Scalable and Efficient Alternative to Backpropagation. arXiv preprint arXiv:2505.05181. (2025, under review)

[6]. **Yin, B.**, Corradi, F. Never Reset Again: A Mathematical Framework for Continual Inference in Recurrent Neural Networks. NICE 2025: Neuro Inspired Computational Elements Conference (2025)

[7]. Zhang, Y., **Yin, B.**, Gomony, M. D., Corporaal, H., Trinitis, C., Corradi, F. Hardware/Software Co-Design Optimization for Training Recurrent Neural Networks at the Edge. Journal of Low Power Electronics and Applications, 15(1), 15.

[8]. Sun, T., **Yin, B.**, Bohte, S.M., Efficient Uncertainty Estimation in Spiking Neural Networks via MC-dropout. *In International Conference on Artificial Neural Networks (2023)*.

[9]. **Yin, B.**, Guo, Q., Corradi, F., Bohte, S.M. Attentive Decision-making and Dynamic Resetting of Continual Running SRNNs for End-to-End Streaming Keyword Spotting. *In International Conference on Neuromorphic Systems (2022)*.

[10]. Anca D. V., **Yin, B.**, Bohte, S.M. Real-time classification of LIDAR data using discrete-time Recurrent Spiking Neural Networks. *In International Joint Conference on Neural Networks (2022)*.

[11]. **Yin, B.**, Scholte, H. S., Bohte, S.M. LocalNorm: Robust Image Classification Through Dynamically Regularized Normalization. *In International Conference on Artificial Neural Networks (2021)*.

[12]. **Yin, B.**, Corradi, F., Bohte, S. M. Effective and efficient computation with multiple-timescale spiking recurrent neural networks. *In International Conference on Neuromorphic Systems (2020)*.

[13]. **Yin, B.**, Balvert, M., van der Spek, R. A., Dutilh, B. E., Bohte, S.M., Veldink, J., Schonhuth, A. Using the structure of genome data in the design of deep neural networks for predicting amyotrophic lateral sclerosis from genotype. *Bioinformatics, 35(14), i538-i547*.

[14]. **Yin, B.**, Balvert, M., Zambrano, D., Schönhuth, A., Bohte, S.M. An image representation based convolutional network for DNA classification. *In International Conference on Learning Representations, 1-17 (2018)*.

TEACHING AND MENTORING

Master's Thesis Co-Supervisor at UvA, TU/e
Co-supervised four Master's theses and mentored an early-stage postdoc transition.

Teaching Assistant for Neural Dynamics and Deep Learning, UvA *Winter 2022, 2023*
Supervised a senior design team of four Master's students; delivered lab sessions and project instruction.

Lecturer ASCI-EDL Winter School on Efficient Deep Learning *Winter 2021*
Introduction to Spiking Neural Networks

Teaching Assistant for Cognitive Computational Neuroscience, UvA *Fall 2021*
Lab sessions and project instruction

INVITED PRESENTATIONS

- Speaking on behalf of junior researchers, *Nature Conference: AI, Neuroscience and Hardware*
- Selective-Update RNNs: A New Architecture for Long-Range Sequence Modeling, *CWI 2026*
- Stochastic Variational Propagation: Local, Scalable and Efficient Alternative to Backpropagation, *Cognitive Computational Neuroscience 2025*

- Training Dynamic Spiking Neural Networks via Forward Propagation Through Time, *SNUFA Workshop 2022*
- Efficient and Effective Spiking Recurrent Neural Networks, *BNAIC/BeNeLearn 2022*
- LocalNorm: Robust Image Classification Through Dynamically Regularized Normalization, *ICANN 2021*
- Effective and Efficient Computation with Multiple-Timescale Spiking Recurrent Neural Networks, *ICONS 2020*
- An Image Representation Based Convolutional Network for DNA Classification, *ICLR 2018*

PROFESSIONAL SERVICE

Journal Reviewing

Nature Computational Science, IEEE Transactions on Neural Networks and Learning Systems, IEEE Transactions on Pattern Analysis and Machine Intelligence, Neural Networks, Frontiers in Computational Neuroscience, Frontiers in Neuroscience