Jing Xu

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EDUCATION

University of Rochester, MS in Electrical and computer engineering GPA: 3.95/4.0 Aug 2024 – May 2026

- **Coursework:**Intro to Computational Neuroscience, Advanced Computational Neuroscience, Advanced Topics in Cognitive Neuroscience, Electrical Engineering Fundamentals, Natural Language Processing

Northeastern University(China), BS in Software engineering Sep 2020 – Jul 2024

- **Coursework:**Artificial Intelligence Technology, Practice for Software Product Construction, Operating Systems

PROFESSIONAL SUMMARY

- University of Rochester ECE Master's student seeking a research (PhD) position in computational neuroscience, with a focused research interest in computational neuroscience . With an interdisciplinary background combining computer engineering and neuroscience research, my expertise lies in applying machine learning models to diverse data modalities, including fMRI, electrophysiology, acoustic signals, and images.

TECHNICAL SKILLS:

- **Data Analysis & Machine Learning**: Python, Matlab
- **Full-Stack Development:** Java, JavaScript, SQL
- **Systems & Infrastructure Programming:** C/C++
- **Mobile Development (iOS):** Swift
- **DevOps & Cloud Technologies:** Amazon Web Services (AWS), Docker, Git, SVN

RESEARCH EXPERIECE

Research Assistant, Carney Lab , University of Rochester May 2025 - Present (Supervised by Dr. Laurel Carney)

- Developed receptive-field encoding models to predict extracellular IC single-neuron responses with frequency and amplitude modulation tuning features (MATLAB).
- Implemented MLP, CNN, and CKAN models to predict neural activity from single-trial data, enhancing model robustness over traditional trial-averaged approaches.
- Analyzing acoustic stimuli signals with signal processing techniques including cochlear filterbanks etc.

Research Assistant, kLab,University of Rochester May 2025 - Sep 2025 (Supervised by Dr. Christopher Kanan)

- Conducted multidimensional quantitative analysis of color representations in SOTA computer vision models and the fMRI responses of human visual cortex (Python).
- Performed Representational Similarity Analysis (RSA) to assess the alignment of computer vision model representations with human perception, evaluating alignment using Pearson's r and Spearman's ρ and contextualizing the results with a leave-one-subject-out noise ceiling analysis.

Summer school research, Neuromatch Aug 2024

- Analyzed large-scale calcium imaging data from $\tilde{1}$0,000 neurons in the mouse visual cortex to characterize functionally coherent neuronal ensembles engaged during stimulus events.
- Applied Non-negative Matrix Factorization to reduce high-dimensional neural activity into 10 low-dimensional "neural factors," identifying functionally coordinated neuronal assemblies that are spatially clustered within the cortical architecture.
- Built an XGBoost model using neural factor activity to predict pupil size dynamics, achieving 90.3% accuracy on test data.

Research Assistant, State Key Laboratory for Novel Software Technology, Nanjing University May 2023 - Sep 2023 (Supervised by Dr. Furao Sheng)

- Developed a framework to convert Artificial Neural Networks (ANNs) to Spiking Neural Networks (SNNs), translating continuous neural signals into sparse, spike-based computation for reduced energy consumption (Python).
- Investigated brain-inspired mechanisms like Surrogate Gradient Learning and Temporal Encoding to enhance the efficiency and accuracy of converted SNNs for potential on-chip applications.

INTERNSHIP

Software Engineer, Shenzhen Kingdom Technology Co., Ltd– May 2023– Aug 2023

- Developed key modules for an institutional operation platform, including parameter management, data dictionary, and user credential updates, utilizing Vue.js and the KOCA framework (Atom/BEX/MyBatis).
- Implemented the “View Customer” module with real-time financial and tracking data integration via backend API, enabling efficient client information access and improving operational efficiency.
- Built an automated due diligence report module with Word/PDF generation and scheduled tasks, ensured accurate data processing and timely report delivery.
- Designed and implemented a "Stock Pledge" module with automated report generation and data verification workflows, streamlined the pledge process through API integration and multi-node data handling.

PROJECTS

Hierarchical Transformers for Multi-Document Summarization *Natural Language Processing(A)*

- Designed and evaluated a hierarchical Transformer model to address cross-document structure in multi-document summarization, overcoming the redundancy and lack of global coherence typical of flat-sequence processing.
- Built a two-stage framework, replacing an LSTM ranker with a BERT-based encoder to jointly encode title-paragraph pairs and improve salient paragraph extraction.
- Developed global Transformer layers with multi-head pooling and inter-paragraph attention to enable effective context fusion across documents.
- Achieved a ROUGE-1 score of 11.11 using the BERT encoder, significantly outperforming the LSTM baseline and demonstrating improved content coverage and relevance.

Backpropagation vs. Prospective Configuration in Neural Networks *Advanced Computational Neuroscience(A)*

- Evaluated the performance of Backpropagation in CNNs versus Prospective Configuration in Predictive Coding Networks (PCNs) on CIFAR-10 image classification and target alignment tasks.
- Developed and trained CNN and PCN models, achieving 64.96% accuracy with CNNs (BP) on CIFAR-10 and demonstrating lower test error for PCNs under specific conditions.

PUBLICATIONS

[1] J. Xu, *Probing the representational geometry of color qualia: Dissociating pure perception from task demands in brains and ai models*, 2025. arXiv: 2510.22800 [cs.NE]. [Online]. Available: https://arxiv.org/abs/2510.22800.

[2] J. Xu, “Research on software design of monitoring system based on bp neural network,” in *2023 7th Asian Conference on Artificial Intelligence Technology (ACAIT)*, 2023, pp. 1195–1199. DOI: 10.1109/ACAIT60137.2023.10528415.