Nam Nguyen

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OBJECTIVE

Looking for a Machine Learning & AI internship position focused on neural data compression, computer vision, and generative modeling - applying advanced information-theoretic frameworks and deep learning to build high-impact intelligent systems.

TECHNICAL SKILLS

- **AI/ML:** Image/Video Compression, Computer Vision, Deep Generative Models
- **Quantitative Research:** Mathematical Modeling, Optimization, Statistics & Probability Theory
- **Programming Languages:** Python, MATLAB, C/C++
- **Frameworks/Tools:** PyTorch, TensorFlow, CompressAI, CVX

WORK EXPERIENCE

Communications and Signal Processing Group **Corvallis, Oregon, USA**
Ph.D. Research Assistant **Mar. 2022 - Present**
Advisor: Prof. Thinh Nguyen and Prof. Bella Bose

Cross-Domain Lossy Compression via Rate- and Classification-constrained Optimal Transport

- Developed a unified compression framework integrating bit-rate, distortion, classification, and perceptual constraints for robust cross-domain generalization.
- Implemented deep compression models (Autoencoder, WGAN, CNN) in Python with differentiable quantization and entropy-constrained losses for image restoration tasks (super-resolution, denoising, inpainting).
- Validated on ImageNet and Kodak datasets, showing strong theory-to-practice alignment.
- **Outputs:** 1 submitted conference paper.

Perception-enhanced Zero-Shot Denoising via Neural Compression

- Developed a patch-based, data-free neural denoiser in Python that optimizes a compression-style objective on a single noisy image, balancing rate, distortion, and perceptual quality.
- Incorporated perception terms and an adversarial critic (WGAN) to trace rate-distortion-perception curves on natural images with Gaussian/Poisson noise.

Universal Rate-Distortion-Classification (RDC) Representations for Lossy Compression

- Designed a trainable RDC objective coupling rate, distortion, and accuracy to learn semantic representations for compression and downstream inference.
- Built deep compression models in Python with differentiable quantization, entropy- and classification-constrained losses, producing empirical RDC curves.
- Demonstrated the learned latent features on MNIST and SVHN datasets serve as compact codecs supporting classification with minimal accuracy loss versus specialized encoders.
- **Outputs:** 1 published conference paper & 1 submitted journal paper.

Design and security analysis of symbol error probability-based beamforming in MIMO wiretap channel

- Developed the mathematical model and PHY signal design for a MIMO beamforming system and proposed a novel low-complexity algorithm to solve optimization problems in the form of non-convex.
- Conducted numerical experiments in MATLAB to evaluate the proposed beamforming scheme.
- **Outputs:** 1 published conference paper & 1 submitted journal paper.

Deakin University Applied Artificial Intelligence Initiative **Burwood, Victoria, Australia**
Machine Learning Research Intern **Jul. 2025 - Sep. 2025**
Mentor: Prof. Mohamed Abdelrazek

AI agentic negotiation

- Extended a multi-agent negotiation evaluation framework, automated experiments, and reproducibility across local LLM models (e.g., LLaMA/Qwen families).
- Implemented belief updates and offer-counteroffer dynamics, designed metrics and dashboards for comparative analysis.

Wireless Systems and Applications Lab **Hanoi, Vietnam**
Research Assistant **Mar. 2019 - Mar. 2023**
Advisor: Prof. Vuong Mai and Prof. Ngoc Dang
Design and Security Analysis of Satellite-based Free-Space Quantum Key Distribution (QKD) Systems for Wireless and Vehicular Networks

- Designed and evaluated satellite-based QKD architectures, incorporating link-layer retransmissions, relaying schemes, and security performance metrics.
- Conducted MATLAB-based simulations to quantify performance and validate analytical results.
- **Outputs:** 2 published conference papers & 2 published journal papers.

EDUCATION

Oregon State University **Mar. 2022 - Mar. 2027 (Expected)**
Ph.D. in Electrical & Computer Engineering Corvallis, OR, US
Minor in Artificial Intelligence
Topics: Machine Learning, Neural Data Compression, Wireless Communications

Oregon State University **Mar. 2022 - Dec. 2024**
M.S. in Electrical & Computer Engineering Corvallis, OR, US
Thesis: *On Minimizing Symbol Error Probability using Beamforming in MIMO Wiretap Channels*

SELECTED PUBLICATIONS

2 journal articles, 4 conference articles. A detailed list of publications is available here.

[1] **Nam Nguyen**, Thinh Nguyen, and Bella Bose. *Cross-Domain Lossy Compression via Rate- and Classification-Constrained Optimal Transport*. Submitted to International Conference on Learning Representations 2026. [PDF]

[2] **Nam Nguyen**, Thuan Nguyen, Thinh Nguyen, and Bella Bose. *Universal Rate-Distortion-Classification Representations for Lossy Compression*. IEEE Information Theory Workshop, 2025. [PDF]

[3] **Nam Nguyen**, An Vuong, Thuan Nguyen, and Thinh Nguyen. *On Minimizing Symbol Error Probability for Antipodal Beamforming in Gaussian MIMO Wiretap Channels*. IEEE Vehicular Technology Conference, 2024. [PDF]

[4] **Nam Nguyen**, Vuong V. Mai, and Ngoc T. Dang, *Reliability Improvement of Satellite-based Quantum Key Distribution Systems using Retransmission Scheme*. Photonic Network Communications, 2021. [PDF]

TRAINING COURSES

AI 637 - Computer Vision, AI 534 - Machine Learning, AI 535 - Deep Learning, AI 539 - Introduction to Online Learning, AI 539 - Information Theory, AI 586 - Applied Matrix Analysis, AI 539 - Convex Optimization, ECE 565 - Estimation, Filtering, and Detection, CS 527 - Error-Correcting Codes, ECE 563 - Wireless Communications Networks, ECE 669 - Communications System Design, ECE 564 - Digital Signal Processing, ECE 560 - Stochastic Signals and Systems, ECE 550 - Linear Systems.

HONORS AND AWARD

- IEEE Signal Processing Society Scholarship 2025
- NSF Student Travel Grant, AERPAW Spring Workshop – North Carolina State University 2025
- Graduate School's Scholarly Presentation Award – Oregon State University 2024, 2025
- Second Prize, National Scientific Research Contest – Vietnam 2020
- Second Prize in Physics, Provincial Excellent Student Competition – Vietnam 2012