FAN XU

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EDUCATION

University of Luxembourg, Luxembourg 06.2023 – present
PhD candidate in Multimodal Deep Learning Department of Computer Science

Technical University of Munich, Germany 10.2019 – 05.2022
Master of Science in Mathematics in Data Science Department of Mathematics

Northwest University, China 09.2012 – 07.2016
Bachelor of Science in Financial Mathematics and Statistics School of Mathematics

Northwest University, China 09.2013 – 07.2015
Bachelor of Arts in Japanese Language and Literature (minor) School of Foreign Languages

PUBLICATIONS

Published

[1] **F. Xu** and L. A. Leiva. "Training-Free Pseudo-Fusion for Composed Image Retrieval with Diffusion Models and Multimodal Large Language Models". In: *Transactions on Machine Learning Research* (Aug. 2026). URL: https://openreview.net/forum?id=6W3pFEQXZc.

[2] **F. Xu**, M. Düring, and L. A. Leiva. "Match Me if You Can: Aligning Historical Posters and Newspaper Articles via Multimodal Deep Learning". In: *Digital Scholarship in the Humanities* (June 2026), fqag088. URL: https://doi.org/10.1093/llc/fqag088.

Under Review

[3] **F. Xu** and L. A. Leiva. *Evaluating and Mitigating Visual and Textual Corruptions with Multimodal Large Language Models in Image-Text Retrieval*. 2026.

[4] **F. Xu** and L. A. Leiva. *Multimodal Large Language Model-Enhanced Probabilistic Embeddings for Composed Image Retrieval*. 2026.

[5] **F. Xu**, Y. Mathansingh, and L. A. Leiva. *Composed Image Retrieval for Cultural Heritage Collections through Query Reformulation with Generative Multimodal Large Language Models*. 2026.

[6] **F. Xu** and L. A. Leiva. *Multimodal Representation Alignment for Cross-modal Information Retrieval*. June 2025. arXiv: 2506.08774. URL: https://arxiv.org/abs/2506.08774.

RESEARCH EXPERIENCE

PhD Research – Multimodal Deep Learning and Information Retrieval 06.2023 – Present

- Study **multimodal representation alignment** for cross-modal information retrieval, focusing on embedding-space geometry, similarity metrics, contrastive learning, and alignment of visual and textual representations.
- Develop **training-free and zero-shot composed image retrieval** approaches using MLLMs and Diffusion Models to convert multimodal queries into interpretable text or image representations without task-specific fusion training.

- Investigate **real-world cross-modal and cross-lingual retrieval** with Vision-Language Models, including retrieval across heterogeneous historical image and text collections enhanced by LLM-based translation and summarization.

Master's Thesis Properties of Linear Operators Related to Gaussian Processes

Bachelor's Thesis Graphic User Interface Design and Quadratic Surface Visualization

SUTDENT SUPERVISION

Master's Theses

1. Yahanaa Mathansingh: Composed Image Retrieval for GLAM Collections with MLLMs (23.02.2026 – 25.08.2026)

Bachelor's Projects

1. Quantized Multimodal Large Language Models for Composed Image Retrieval (06.10.2026 – 01.15.2027)
2. Mitigating Multimodal Perturbed Embeddings with MLLMs (24.02.2026 – 07.07.2026)
3. Sentiment Analysis for Multimodal Datasets (15.10.2025 – 15.01.2026)
4. Exploring the Robustness of Multimodal Models (15.10.2025 – 15.01.2026)
5. Evolution of Feature Spaces Across Deep Neural Network Layers (19.02.2024 – 01.06.2024)
6. Clustering and Visualization of Embedding Spaces of Multimodal Learning Models (18.09.2023 – 23.12.2023)

TEACHING ACTIVITIES

1. Human-Computer Interaction — Teaching Assistant (09.2026 – 01.2027)
2. Introduction to Deep Learning — Teaching Assistant (02.2026 – 06.2026)
3. Human-Computer Interaction — Teaching Assistant (09.2025 – 01.2026)
4. Human-Computer Interaction — Teaching Assistant (09.2024 – 01.2025)

PAPER REVIEWING

SIGIR 2024, CIKM 2024, ECIR 2024, SIGIR 2025, ICLR 2026, WWW 2026, CIKM 2026

ACADEMIC ACTIVITIES

1. Research Exchange: Prof. Thomas Smits, University of Amsterdam, Amsterdam, the Netherlands (13.09.2025 – 15.10.2025)
2. Research Exchange: Prof. Nicu Sebe, University of Trento, Trento, Italy (24.06.2025 – 02.08.2025)
3. Metochi Summer School: Deep Data Science for Digital History, Metochi, Greece (15.06.2025 – 22.06.2025)
4. Ellis Summer School: Probabilistic Machine Learning, University of Cambridge, Cambridge, UK (15.07.2024 – 19.07.2024)
5. Ellis Summer School: Collaborative and Generative AI, Aalto University, Helsinki, Finland (01.07.2024 – 05.07.2024)
6. The 8th Summer School on Computational Interaction, ACM Europe School (03.06.2024 – 07.06.2024)

WORK EXPERIENCE & INTERNSHIPS

New Oriental Education & Technology Group 05.2021 – 07.2021
Data Scientist Intern (full-time) *Beijing, China*

Bank of China 12.2016 – 06.2017
Bank Clerk *Xi'an, China*

Bank of China 10.2016 – 12.2016
Student Assistant Intern (full-time) *Xi'an, China*

SKILLS

Python	Proficient	**R**	Proficient	**MATLAB**	Proficient
SQL	Proficient	**SPARK**	Proficient	**LATEX**	Proficient
JAVA	Familiar	**Scala**	Familiar	**C++**	Fundamental

LANGUAGES

Chinese (native), English (C2), German (B1), Japanese (N2)