

Viet Anh Khoa Tran

KTRAN.DE

RESEARCH

Neuromorphic Software Ecosystems (PGI-15), Forschungszentrum Jülich April 2023 - now
PhD Candidate

- Taking inspiration from biological brains, especially the role of dendritic computations, I am exploring learning algorithms and architectures that learn continually, efficiently and locally. I am working towards a closed-loop visual reasoner implemented on neuromorphic hardware.

Computation in Neural Circuits (INM-6), Forschungszentrum Jülich March 2022 - March 2023
Student research assistant

- Explored and developed methods for efficient, biologically plausible multi-task learning algorithms and artificial neural architectures based on insights on top-down and recurrent dendritic modulations stemming from the work of my supervisor Dr. Willem Wybo.

Chair for Human Language Technology (i6), RWTH Aachen October 2018 - May 2022
Student research assistant

- Conceived, analyzed and implemented machine learning methods for natural language processing problems under Prof. Hermann Ney.
- Implemented and analyzed various extensions to the Transformer Architecture, focusing on positional encodings, as part of my Bachelor's thesis.
- Systematically analyzed and implemented sampling methods for approximating training losses of language models with large vocabularies.
- Contextualized and critically dissected joint training methods in speech translation.

EDUCATION

RWTH Aachen September 2019 - March 2023
M. Sc. Data Science Overall grade: 1.0 (with distinction)

- **Thesis:** "Towards Biologically Plausible Contextual Adaptation through Task-Modulated Contrastive Learning" Statistical Classification and Machine Learning, Parallel and data-centric Programming, Advanced Machine Learning, Computer Vision

University of Waterloo September 2019 - December 2019
Exchange semester

RWTH Aachen September 2016 - August 2019
B. Sc. Computer Science Overall grade: 1.2 (with distinction)

- **Thesis:** "Extensions to the Transformer Architecture for Neural Machine Translation"
 - Implemented and analyzed various extensions to the Transformer Architecture previously proposed in literature.

PUBLICATIONS

NMDA-driven dendritic modulation enables multitask representation learning in hierarchical sensory processing pathways.

Willem A. M. Wybo, Matthias C. Tsai, Viet Anh Khoa Tran, Bernd Illing, Jakob Jordan, Abigail Morrison, Walter Senn
published in Proceedings of the National Academy of Sciences, Volume 120, Issue 32. (2023).

Does Joint Training Really Help Cascaded Speech Translation?

Viet Anh Khoa Tran, David Thulke, Yingbo Gao, Christian Herold, Hermann Ney
published at EMNLP 2022

On Sampling-Based Training Criteria for Neural Language Modeling.

Yingbo Gao, David Thulke, Alexander Gerstenberger, Viet Anh Khoa Tran, Ralf Schlüter, Hermann Ney
published at INTERSPEECH 2021

Analysis of positional encodings for neural machine translation.

Jan Rosendahl, Viet Anh Khoa Tran, Weiyue Wang, Hermann Ney
published at IWSLT 2019

POSTER PRESENTATIONS

Continual learning using dendritic modulations on view-invariant feedforward weights.

Viet Anh Khoa Tran, Willem A. M. Wybo, Emre O. Neftci
presented at COSYNE 2024

TEACHING EXPERIENCE

Software Modeling and Verification (i2), RWTH Aachen

March 2018 - August 2018

Student teaching assistant for the course "Data Structures and Algorithms"

- Worked under Prof. Katoen, assisting in exam and midterm corrections.
- Tutored a weekly exercise class, corrected and graded weekly submissions.

Research Group Computer Science 2, RWTH Aachen

September 2017 - January 2018

Student teaching assistant for the course "Programming"

- Worked under Prof. Giesl, assisting in exam and midterm corrections.
- Tutored a weekly exercise class, corrected and graded weekly submissions.
- Created levels for "Codescape", a serious game project aiming to assist beginners in Java programming.

SCHOLARSHIPS AND AWARDS

Deutschlandstipendium

October 2019

- A federal-level merit-based scholarship for students at state universities.

PROMOS Study Abroad Scholarship

September 2019 - December 2019

- The German Academic Exchange Service (DAAD) financially supported my stay at the University of Waterloo.

Dean's List

2017 - 2022

- Awarded to the top 5 percent students of the degree program.

LANGUAGES

- **Formal languages**

Python (incl. JAX, PyTorch, etc.), *Linux/Bash* (proficient); *Java*, *C* (intermediate), *C++*, *JavaScript*, *SQL*, *PHP* (basic)

- **Natural languages**

German (native), *English* (fluent), *French*, *Vietnamese* (basic)

EXTRA-CURRICULAR

Student dormitory Am Weißenberg, Aachen

September 2016 - March 2023

Core member of the dormitory's network team

- Responsible for the security as well as the reliability of the dormitory's network.
- Implemented measures in order to streamline the dormitory's identity management and access point management.