

Viet Anh Khoa Tran

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RESEARCH

Neuromorphic Software Ecosystems (PGI-15), Forschungszentrum Jülich

April 2023 - now

PhD Researcher

- Working towards continual, local, and data-efficient learning algorithms targeted at neuromorphic hardware with Prof. Emre Neftci and Dr. Willem Wybo.

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"
- Relevant courses: Algorithmic Foundations of Data Science, High-Dimensional Probability Theory, Graph 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

- Relevant courses: Machine Learning, Computational Vision

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.

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.

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.

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.

PUBLICATIONS AND PREPRINTS

Neuro-Inspired Machine Learning

- Wybo, W. A. M., Tsai, M., **Tran, V. A. K.**, Illing, B., Jordan, J., Senn, W., Morrison, A. (2023). *NMDA-driven dendritic modulation enables multitask representation learning in hierarchical sensory processing pathways*. Proceedings of the National Academy of Sciences, Volume 120, Issue 32.

Natural Language Processing

- **Tran, V. A. K.**, Thulke, D., Gao, Y., Herold, C. & Ney, H. (2022). *Does Joint Training Really Help Cascaded Speech Translation?* Empirical Methods in Natural Language Processing, Abu Dhabi, United Arab Emirates.
- Rosendahl, J., **Tran, V. A. K.**, Wang, W., & Ney, H. (2019). *Analysis of Positional Encodings for Neural Machine Translation*. IWSLT, Hong Kong, China.
- Gao, Y., Thulke, D., Gerstenberger, A., **Tran, K. V.**, Schlüter, R., & Ney, H. (2021). *On Sampling-Based Training Criteria for Neural Language Modeling*. Interspeech, Brno, Czechia.