

# Keyu Wang

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## EDUCATION

### University of Tuebingen

*M.Sc. in Machine Learning*

Tuebingen, Germany

*Oct. 2024 – Present*

**Cumulative GPA:** 1.28 (Germany System: 1.0 is the best, 5.0 is the lowest)

**Relevant coursework:** Non-convex Optimization of Deep Learning, etc.

### Southeast University

*B.Eng. in Artificial Intelligence*

Nanjing, China

*Sep. 2020 – Jun. 2024*

**Cumulative GPA:** 3.79/4.00, Top 10% (Chinese System: 4.0 is the best, 0 is the lowest)

**Relevant coursework:** Linear Algebra, Calculus, Optimization, Probability Statistics & Stochastic Processes, Data Structures, Database, Distributed Systems, Machine Learning, Deep Learning, Natural Language Processing, etc.

## RESEARCH INTERESTS

- **Machine Learning Systems & AI Efficiency:** Efficient model training, fine-tuning, deployment and inference.
- **Optimization:** Optimization and theoretical understanding in Deep Neural Networks.
- **Reasoning:** Mathematical Reasoning & Benchmarking, Logic, Chain-of-Thought, Self-consistency, etc.
- **AI Safety & Trustworthy:** Safe & Explainable Language Models, Neuro-symbolic AI, etc.
- **Generative AI:** Large Language Models, Diffusion Models, Multimodal Large Language Models.

## PUBLICATIONS

### Peer-reviewed Conference

[1] **Can Large Language Models Understand DL-Lite Ontologies? An Empirical Study.**

**Keyu Wang**, Guilin Qi, Jiaqi Li and Songlin Zhai. In Findings of the Association for Computational Linguistics: EMNLP 2024, pages 2503–2519. <https://aclanthology.org/2024.findings-emnlp.141/>

[2] **An Embedding-based Approach to Inconsistency-tolerancy Reasoning with Inconsistent Ontologies.**

**Keyu Wang**, Site Li, Jiaye Li, Guilin Qi and Qiu Ji. In Proceedings of The 12th International Joint Conference on Knowledge Graphs. <https://arxiv.org/abs/2304.01664>

### Journal

[1] **Embedding Ontologies via Incorporating Extensional and Intensional Knowledge.**

**Keyu Wang**, Guilin Qi, Jiaoyan Chen, Yi Huang and Tianxing Wu. In Data Intelligence, Vol. 7, Issue 4, 1222-1241, 2024. DOI: <https://doi.org/10.3724/2096-7004.di.2024.0088>

## RESEARCH EXPERIENCE

### Wild, Efficient, and Innovation AI Lab

*Research intern | Supervisor: Dr. Shiwei Liu*

Tuebingen, Germany

*Feb. 2025 – Present*

- Investigating on pruning LLMs.

### Knowledge Science & Engineering Lab | Southeast University

*Research intern | Supervisor: Prof. Dr. Guilin Qi*

Nanjing, China

*Jan. 2022 – Jul. 2024*

- **Evaluating LLMs on Description Logic (DL) Reasoning:** (1) Analyzed LLMs' capability of understanding DL ontologies covering 6 tasks: syntax checking, concept subsumption, instance checking, query answering, satisfiability and property probing; (2) Demonstrated that LLMs can understand syntax and semantics of concepts and roles well but struggle with understanding Negative Inclusion transitivity and handling with large instances.
- **Knowledge-Pair Ontology Embedding:** (1) Designed a framework to embed ontologies in two spaces, namely extensional and intensional space to jointly learn extensional and intensional knowledge; (2) Conducted experiments and showed significantly better performances in triple classification and link prediction.
- **Inconsistency-tolerant Reasoning:** (1) Proposed an embedding-based method to extend inconsistency-tolerant reasoning methods from propositional logic to description logics by considering the semantics of the axioms; (2) Proved logical properties of rational monotonic reasoning and demonstrated empirical effectiveness and efficiency.

## INTERNSHIP

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### **BSH Home Appliances Holding (China) Co., Ltd**

Nanjing, China

*Intern | Mentor: Rick Du, Huilong An*

*Jul. 2023 – Jun. 2024*

- **AI-enabled efficient R&D in Wash Machine/Dryer:** Bridged the logical and casual relationships among hardware platform, program design, test standard, intermediate data and performances of Bosch and Siemens wash machines, especially, built a predictive model via deep learning to predict washing performances.

## GRANTS & AWARDS

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### **Selected Grants**

- **Jiangsu Province University Student Innovation and Entrepreneurship Project Fund (< 5%)**

Role: Lead | Value: 8000 CNY ( $\approx$  1067 EUR)

Jul. 2022 – May. 2023

### **Selected Awards**

- **First Prize in Jiangsu Province University Students' Advanced Mathematics Competition** Jun. 2021
- **First Prize in Southeast University Advanced Mathematics Competition** (rank 8, 0.4%) Apr. 2021
- **First Prize in Southeast University Programming Contest** (rank 5, < 5%) Dec. 2020
- **Silver Medal in China Southeast Mathematical Olympiad (CSMO)** Jul. 2019

## EXTRACURRICULAR

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Study advisor for freshman undergraduates

Sep. 2022 – Jun. 2023

Engineering leader & co-founder of Artificial Intelligence Association of Southeast University [SEU-131AIClub]

May 2022 – Jun. 2023

Student lecturer for the course *An Entertaining Introduction to AI at the Second Class for Students* held jointly by SEU-131AIClub and the Department of CSE of Southeast University

Sep. 2022 – Dec. 2022

## SKILLS

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**Programming:** Python (PyTorch), C/C++, Java, etc.

**Tools:** VS Code, Jupyter Notebook, Shell,  $\text{\LaTeX}$ , Markdown, etc.

**Languages:** Chinese (Native), English (IELTS 7.5).