

CHENG QIAN

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EDUCATION

University of Illinois, Urbana-Champaign, *Ph.D.* 2024 – Present

- Member of **BLENDER Lab**, advised by Prof. Heng Ji.
- **Research Interest:** Natural Language Processing, LLM Tool Learning and LLM-driven AI Agent; LLM Efficient Training and Knowledge Acquisition; LLM Reasoning; LLM-User Interaction.

Tsinghua University, *B.Eng.* in Computer Science and Technology (GPA: 3.90 / 4.00) 2020 – 2024

- Member of **THUNLP**, advised by Prof. Zhiyuan Liu.

PUBLICATIONS

[1] Yaxi Lu, Shenzhi Yang, **Cheng Qian**, Guirong Chen, Qinyu Luo, Yesai Wu, Huadong Wang, Xin Cong, Zhong Zhang, Yankai Lin, Zhiyuan Liu, Fangming Liu, Maosong Sun. Proactive Agent: Learning to Proactively Predict Implicit Human Intents. *ICLR 2025 Under Review*.

[2] Bingxiang He*, Ning Ding*, **Cheng Qian***, Jia Deng, Ganqu Cui, Lifan Yuan, Huan-ang Gao, Huimin Chen, Zhiyuan Liu, Maosong Sun. [Zero-Shot Generalization during Instruction Tuning: Insights from Similarity and Granularity](#). *ICLR 2025 Under Review*.

[3] **Cheng Qian***, Bingxiang He*, Zhong Zhuang, Jia Deng, Yujia Qin, Xin Cong, Zhong Zhang, Jie Zhou, Yankai Lin, Zhiyuan Liu, Maosong Sun. [Tell Me More! Towards Implicit User Intention Understanding of Language Model Driven Agents](#). *ACL 2024*.

[4] **Cheng Qian**, Xinran Zhao, Sherry Tongshuang Wu. [“Merge Conflicts!” Exploring the Impacts of External Distractors to Parametric Knowledge Graphs](#). *COLM 2024*.

[5] **Cheng Qian**, Chenyan Xiong, Zhenghao Liu, Zhiyuan Liu. [Toolink: Linking Toolkit Creation and Using through Chain-of-Solving on Open-Source Model](#). *NAACL 2024*.

[6] **Cheng Qian**, Chi Han, Yi R. Fung, Yujia Qin, Zhiyuan Liu, Heng Ji. [CREATOR: Disentangling Abstract and Concrete Reasonings of Large Language Models through Tool Creation](#). *Findings of EMNLP 2023*.

[7] Yujia Qin, Shengding Hu, ..., **Cheng Qian**, ..., Tongshuang Wu, Heng Ji, Zhiyuan Liu, Maosong Sun. [Tool Learning with Foundation Models](#). *ACM Computing Survey*.

[8] **Cheng Qian***, Shihao Liang*, Yujia Qin, Yining Ye, Xin Cong, Yankai Lin, Yesai Wu, Zhiyuan Liu, Maosong Sun. [Investigate-Consolidate-Exploit: A General Strategy for Inter-Task Agent Self-Evolution](#).

[9] Yujia Qin*, **Cheng Qian***, Xu Han, Yankai Lin, Huadong Wang, Ruobing Xie, Zhiyuan Liu, Maosong Sun, Jie Zhou. [Recyclable Tuning for Continual Pre-training](#). *Findings of ACL 2023*.

[10] Yujia Qin*, **Cheng Qian***, Jing Yi*, Weize Chen, Yankai Lin, Xu Han, Zhiyuan Liu, Maosong Sun, Jie Zhou. [Exploring Mode Connectivity for Pretrained Language Models](#). *EMNLP 2022*.

(* indicates equal contribution)

Patents:

1. Name: Training Method, Device, Medium, and Program Product for Predictive Model. Type: Invention. Inventors: Zhiyuan Liu, Maosong Sun, **Cheng Qian (Technical Lead)**, Yujia Qin, Yankai Lin, Ruobing Xie, Jie Zhou, Tsinghua University & Tencent Inc. Ref. Num: CN202211242596.7.

Talks:

1. Tool Learning and Tool Creation of LLM, invited talk at SenseTime Smart City Group, 2023.6.

RESEARCH & PROJECTS

1. **Graduate Research Assistant**, BLENDER Lab, UIUC. **Advisor: Prof. Heng Ji** 2024 – Present

- **Dialogue agent as lifelong companion (ongoing):** Design agent system that could automatically extract user profiles, preferences, and events at utterance level; Built hierarchical agent memory system for more tailored and coherent response generation.

2. **Undergraduate Research Assistant**, THUNLP, THU. **Advisor: Prof. Zhiyuan Liu** 2021 – 2024
 - **Proactive agent design:** Trained agent that could proactively notice implicit needs from users and provide help; Released annotated dataset containing events for proactive training in three domains including smart home, coding, and writing.
 - **Agent for implicit intention understanding:** Released Mistral-Interact, a powerful model for human’s implicit intention understanding during the human-agent conversation.
 - **LLM-driven AI agent (XAgent):** Released XAgent, an autonomous agent for complex task solving; Enhanced consistency, stability, and human-agent interaction; Beat GPT-4 and pioneering projects (e.g. AutoGPT) on various math, code, QA benchmarks; Reached over 8k stars on GitHub.
 - **Tool learning with foundation models:** Formulated a tool learning framework, in which foundation models learn to understand user instructions, decompose complex tasks, adjust plans through reasoning, and conquer sub-tasks by applying appropriate tools.
 - **LLM efficient knowledge acquisition:** Formulated the task compatible tuning: how to make earlier adapted weights compatible with upgraded LLMs during lifelong pre-training scenarios; Designed two methods that raise 10x training efficiency while maintaining comparable performance.
 - **LLM knowledge interpretability:** Analyzed the geometric distribution of different minima in loss landscape through the lens of mode connectivity (minima connected via a low loss path).
3. **Visiting Student**, WInE Lab, CMU. **Advisor: Prof. Sherry Tongshuang Wu** 2023
 - **External and parametric knowledge conflicts:** Investigated how LLMs respond to knowledge conflicts systematically; Proposed Parametric Knowledge Graph to model the LLM’s internal knowledge.
4. **Visiting Student**, BLENDER Lab, UIUC. **Advisor: Prof. Heng Ji** 2023
 - **LLM tool creation:** Investigated LLM’s ability to create tools for task-solving; Devised CREATOR framework, which enables tool creation through 4 stages: creation, decision, execution, and rectification.
5. **Visiting Student**, Chenyan’s Group, CMU. **Advisor: Prof. Chenyan Xiong** 2023
 - **Open-source adaptation of tool-use ability:** Proposed Toolink framework, which effectively transfers tool-use ability to open-sourced LLaMA models; Beat CoT and finetuning on diverse BIG-bench tasks.

SELECTED AWARDS & HONORS

1. Comprehensive Excellence Scholarship, highest scholarship in Dept. of CST, **Top 1 in 180.** 2021, 2023
2. Volunteering & Social Survey Excellence Scholarship, Tsinghua University, **Top 1 in 180.** 2022
3. Awards of Excellent Student Cadre, Tsinghua University. 2021
4. Five-Star (Highest Honor) Volunteer, Tsinghua University. 2022
5. Second Prize in National Undergraduate Physics Competition, Beijing Physics Society. 2022
6. Third Prize in THU Challenge Cup Academic Competition, Tsinghua University. 2022
7. Honorable Mention in 2023 Mathematical Contest in Modeling (MCM) 2023

SKILLS

English Skills

- TOEFL (Best) 115/120 (Reading 30, Listening 30, Speaking 26, Writing 29).
- GRE Verbal Reasoning 162/170, Quantitative Reasoning 170/170, Analytical Writing 4/6.

Technical Skills

- Proficient in C/C++, Python (PyTorch), LaTeX, Linux.
- Familiar with various neural networks and state-of-the-art deep learning techniques.