School of Engineering and Applied Science
Department of Computer and Information Science
3330 Walnut Street
Levine Hall
Philadelphia, PA 19104-6309

December 21, 2024

To the admissions committee:

I am writing to give Tianyi Zhang my strongest recommendation for your PhD program in Natural Language Processing. Tianyi recently completed her master's degree in Data Science here at the University of Pennsylvania. Prior to that, she earned a master's degree in Learning Science and Technology through Penn's Graduate School of Education. She was an exceptional student in both programs.
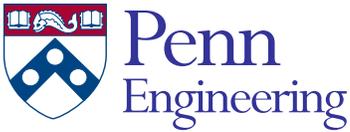
I had the pleasure of working closely with Tianyi on several research projects during her time at Penn. She took three courses from me: Artificial Intelligence (a large lecture class in which she earned an A+), a graduate seminar on Interactive Fiction and Text Generation with large language models (A), and a research practicum course (A+), which I specially invited Tianyi to participate in based on her outstanding academic performance and research potential.

In Fall 2022, Tianyi participated in an experimental research practicum course I developed to mentor promising master's and undergraduate students interested in AI and NLP research. The course brought together approximately 40 students, pairing them with PhD student mentors in small groups. Under the mentorship of my PhD student Harry Li Zhang and my postdoc Lara J. Martin, Tianyi led a team of 6 master's students on a project inspired by our work in the DARPA program "Knowledge-directed Artificial Intelligence Reasoning Over Schemas (KAIROS)". The goal was to create schematic representations of events that could represent the participants, temporal relationships between sub-events, and alternate paths of sub-events.

Tianyi worked closely with me, Harry, and several other KAIROS teammates, including Professors Heng Ji and Martha Palmer. Her team created a system that interactively queried GPT-3 to:
1. Generate steps involved in a complex event, allowing for human curation
2. Predict entities that typically participate in each sub-event
3. Temporally order the sub-events
4. Ground the entities and events into an ontology derived from WikiData

This resulted in an ACL 2023 Demo paper with Tianyi as first author, titled "Human-in-the-Loop Schema Induction". Throughout the project, Tianyi demonstrated excellent collaboration skills with both professors and students from Penn and other institutions; strong leadership in achieving good outcomes and publishing; clear communication and cooperation; resilience in overcoming research challenges; and an exceptional work ethic.

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Impressed by her performance, I invited Tianyi to continue working as an RA on projects focused on planning and language models under the mentorship of my former PhD student Harry Li Zhang, who is now starting as a faculty member at Drexel University. This work resulted in two significant publications - PROC2PDDL and PDDLEGO - that advanced the state-of-the-art in using large language models for automated planning.

According to Harry's assessment, Tianyi has been the most independent of the master's students he has mentored. She has demonstrated the ability to formulate, lead, and carry out entire research projects. She is hardworking, reliable, and always delivers high-quality work on time. Moreover, Tianyi has a strong grasp of the big picture and a curiosity to explore, which is rare for an early-stage researcher.

After completing her master's degree, Tianyi generously returned to informally assist with my CIS 7000 interactive fiction class. She took on a mentorship role for a team of students, helping them develop their term project into a publishable workshop paper. The resulting work, "WorldWeaver," presents an innovative system for procedural text adventure game generation using large language models. The system incorporates a human-in-the-loop approach that allows game creators to intervene and modify generated components while maintaining semantic and logical coherence. This work demonstrated not only Tianyi's technical expertise but also her ability to effectively mentor other students in research and publication.
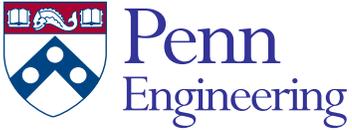
In summary, Tianyi Zhang is an exceptionally talented and dedicated researcher. She has demonstrated strong technical skills, leadership, passion for NLP, and the ability to conduct independent research and collaborate effectively. Her diversity of research experience spanning event extraction, schema induction, natural language to symbolic translation, planning, and language model applications will enable her to make valuable contributions to your program.

I believe Tianyi has tremendous potential for research success at the PhD level and I recommend her with great enthusiasm. Please feel free to contact me if you have any other questions.

Sincerely,

Chris Callison-Burch, Ph.D.
Associate Professor
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About me: I am an associate professor of Computer and Information Science at the University of Pennsylvania. Before joining Penn, I was a research faculty member at the Center for Language and Speech Processing at Johns Hopkins University for 6 years. I was the Chair of the Executive Board of the North American chapter of the Association for Computational Linguistics (NAACL) from 2011-2013. I have served on the editorial boards of the journals Transactions of the ACL (TACL) and Computational Linguistics. I served as the General Chair of the ACL 2017 conference. I have more than 100 publications, which have been cited over 20,000 times. I am a Sloan Research Fellow, and I have received faculty research awards from Google, Microsoft, Amazon and Facebook in addition to funding from DARPA and the NSF.

Professor Dr. Lucie Flek
Data Science and Language Technologies

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Bonn, 07.12.2024

Dear Admissions Committee,

It is with great pleasure that I write this letter of recommendation for Tianyi Zhang, who has been an exceptional PhD-level visiting researcher in my research group. I strongly believe that Tianyi possesses the necessary skills, dedication, and potential to excel in a PhD program, and I wholeheartedly support her application.

During her Lamarr Institute visiting researcher internship, Tianyi consistently demonstrates an exceptional combination of intellectual rigor, creativity, independence, collaboration, and dedication throughout her time here. Her work on our collaborative project, pretraining language models with a Natural Language and Knowledge Graph Reconstruction Loop, has been both remarkable and impactful. By drawing inspiration from human learning mechanisms she devised a novel unsupervised pretraining framework that incorporates deeper semantic and logical reasoning into language models compared to existing pretraining tasks.

Tianyi demonstrated strong independent research abilities, from proposing innovative ideas to conducting thorough research and drafting the paper. Her ability to work autonomously and drive the project forward was truly commendable. Furthermore, Tianyi displayed a deep enthusiasm for her research project. Her passion for the subject matter was evident in her eagerness to learn, her insightful questions, and her commitment to pushing the boundaries of our understanding in this field.

One of Tianyi's most outstanding qualities is her strong work ethic. She consistently devoted a significant amount of time and effort to our research project, going above and beyond what was expected of her. Her hardworking nature and willingness to put in the necessary hours were instrumental in the success of our work.

Tianyi has shown excellent collaboration skills, working seamlessly with my research group, including myself, Dr. Florian Mai, Dr. Weifan Chen, and other team members. Her ability to integrate feedback and continuously improve through group discussions has been shown by advancing the collective goals of the team.

In conclusion, I enthusiastically recommend Tianyi Zhang for your PhD position. Her collaboration skills, strong work ethic, deep enthusiasm, independent research abilities, and creativity make her an outstanding candidate who will undoubtedly thrive in an NLP doctoral program. I am confident that she will make significant contributions to her chosen field of study, and I look forward to seeing her future achievements.

If you have any further questions, please do not hesitate to contact me.

Sincerely,

Prof. Dr. Lucie Flek
Data Science and Language Technologies