TINGFENG LUO

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Research Interests

- AI for Science (Drug Discovery/Chemistry/Biology/Healthcare)
- Language Adaptation for Science Communication

Education

University of Illinois Urbana-Champaign　　　　　　　　　　**Aug. 2021 – May. 2025 (expected)**
B.S. in Computer Science　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　*GPA: 3.89*

- Deans List

Research Experience

University of Illinois Urbana-Champaign　　　　　　　　　　　　　　　　　**Oct. 2024 – Present**
Research Assistant, Language Interaction Lab　　　　　　　　　　　　　　　　　　　*Champaign, IL*
Advisor: **Prof. Tal August**

Automatic Language adaptation in Cross-Domain Communication (In Progress)

- Analyzing conversation gaps in interdisciplinary communication
- Investigating automatic language adaptation for improving clarity and mutual understanding in cross-domain collaboration
- Developing LLM-based tools to bridge knowledge gaps and enhance knowledge exchange across disciplines

Making Clinical Documents Readable to Non-professionals (In Progress)

- Designing an interactive clinical document reading system to address major barriers such as medical jargon, abbreviations, and complex clinical metrics, making health information more accessible to the general public
- Incorporating interactive features like in-situ definitions, lay language summaries, and focused reading modes to help users better understand their medical conditions
- Leveraging large language models and retrieval-augmented generation techniques to provide accurate, context-sensitive explanations of medical terms and indices
- Conducting user evaluations with diverse participants to verify the system's usability and clarity against baseline document viewers

University of Illinois Urbana-Champaign　　　　　　　　　　　　　　　　　**Nov. 2022 – Present**
Research Assistant, Data Mining Group, Molecule Maker Lab Institute　　　　　　　　　*Champaign, IL*
Advisor: **Prof. Jiawei Han**

Science Quest: A Language Model Enhanced Scientific Search Tool (In Progress)

- Leading research of domain knowledge enhanced dense retrieval model for scientific literature
- Addressing the long existing issue of time-consuming exploration on reaction conditions

ActionIE: Action Extraction from Scientific Literature with Programming Languages

- Established a framework leveraging large language models to extract structured experimental procedures from unstructured scientific literature and patents
- Framed the extraction task as a code generation problem, using Python classes to encode actions and their relationships for better interpretability and adaptability
- Proposed a graph-based evaluation metric to assess the precision and usability of the extracted action sequences, achieving superior alignment with human judgments
- Constructed a new benchmark dataset from scientific literature, offering a more realistic and extensive testbed compared to prior datasets
- Paper Accepted by ACL 2024

Reaction Miner: An Integrated System for Chemical Reaction Extraction from Textual Data
- Developed a unified system to extract reactions from raw scientific literature into structured tables by reframing information extraction as a question answering task
- Integrated a PDF-to-text module tailored for chemical literature, enhancing text coherence using dynamic similarity calculations for seamless extraction workflows
- Fine-tuned the extraction module based on Llama3.1 with synthetical data, achieving superior performance
- Paper accepted by EMNLP 2023 Demo

Pfizer   **Aug. 2020 – May. 2021**
Research Assistant   *Kalamazoo, MI*
Advisor: **Dr. Fu Liao**

Synthesis Optimization of Antibiotics for Gonorrhea Infection
- Investigated the inhibition of glucose on the growth of *Streptomyces spectabilis*
- Achieved 300% increase in spectinomycin yield from *Streptomyces spectabilis* via manipulation of media concentrations
- Granted USAID the Science for Development Award

Western Michigan University   **Aug. 2019 – May. 2020**
Research Assistant, Teske Lab   *Kalamazoo, MI*
Advisor: **Prof. Kelly Teske**

Lead Optimization of Immunotherapy for Colorectal Cancer
- Investigated the gene regulation mechanism of miRNA-31
- Synthesized a novel phenylisoxazole sulfonamide analogue by coupling with to benzimidazole inhibit miRNA-31 for the treatment of colorectal cancer

Publications

ActionIE: Action Extraction from Scientific Literature with Programming Languages
- Xianrui Zhong, Yufeng Du, Siru Ouyang, Ming Zhong, **Tingfeng Luo**, Qirong Ho, Hao Peng, Heng Ji, Jiawei Han
- ACL 2024

Reaction Miner: An Integrated System for Chemical Reaction Extraction from Textual Data
- Ming Zhong, Siru Ouyang, Yizhu Jiao, Priyanka Kargupta, **Leo Luo**, Yanzhen Shen, Bobby Zhou, Xianrui Zhong, Xuan Liu, Hongxiang Li, Jinfeng Xiao, Minhao Jiang, Vivian Hu, Xuan Wang, Heng Ji, Martin Burke, Huimin Zhao, Jiawei Han
- EMNLP 2023 Demo

Awards

USAID Science for Development Award, 2021