

Yinghao Li

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EDUCATION

Georgia Institute of Technology

- *Ph.D. in Machine Learning*

- Advisor: Dr. [Chao Zhang](#) and Prof. [Le Song](#)

- Research Interests: Language Models; Information Extraction; Weak Supervision; Uncertainty Estimation;

- *M.S. in Electrical and Computer Engineering*

- Advisor: Dr. [Chao Zhang](#) and Prof. [Ying Zhang](#)

- Research Interests: Text Generation; Signal Processing;

Southeast University

- *B.Eng. in Instrument Science and Engineering*

- Advisor: Dr. [Lifeng Zhu](#)

- Research Interests: 3D Reconstruction; Embedded System;

Atlanta, GA

August 2020 – May 2025 (expected)

August 2018 – May 2020

Nanjing, China

August 2014 – June 2018

EXPERIENCE

Amazon AWS

- *Applied Scientist Intern*

- Mentor: Dr. [Vianne Gao](#); Manager: Dr. [Ali Torkamani](#)

- Developed an Ensembles of LoRA expert framework for better language model adaptation to down-stream tasks.

Amazon.com, Inc.

- *Applied Scientist Intern*

- Mentor: Dr. [Colin Lockard](#); Manager: Dr. [Prashant Shiralkar](#)

- Developed Transformer-based graph node classification model and dataset for extracting shopping interest-related product types from HTML webpages.

New York, NY

May 2024 – August 2024

Seattle, WA

May 2022 – December 2022

SELECTED PUBLICATIONS

• Ensembles of Low-Rank Expert Adapters

Yinghao Li, Vianne R. Gao, Chao Zhang, Ali Torkamani

Submission of *ICLR*, 2025.

• A Simple but Effective Approach to Improve Structured Language Model Output for Information Extraction

Yinghao Li, Rampi Ramprasad, Chao Zhang

In *EMNLP Findings*, 2024.

• Assessing Logical Puzzle Solving in Large Language Models: Insights from a Minesweeper Case Study

Yinghao Li, Haorui Wang, Chao Zhang

In *NAACL*, 2024.

• MUBen: Benchmarking the Uncertainty of Molecular Representation Models

Yinghao Li, Ling kai Kong, Yuanqi Du, Yue Yu, Yuchen Zhuang, Wenhao Mu, Chao Zhang

In *TMLR*, 2024.

• Extracting Shopping Interest-Related Product Types from the Web

Yinghao Li, Colin Lockard, Prashant Shiralkar, Chao Zhang

In *EMNLP Findings*, 2023.

• Sparse Conditional Hidden Markov Model for Weakly Supervised Named Entity Recognition

Yinghao Li, Le Song, Chao Zhang

In *KDD*, 2022.

• WRENCH: A Comprehensive Benchmark for Weak Supervision

Jieyu Zhang, Yue Yu, **Yinghao Li**, Yujing Wang, Yaming Yang, Mao Yang, Alexander J. Ratner

In *NeurIPS Benchmark*, 2021.

• BERTifying the Hidden Markov Model for Multi-Source Weakly Supervised Named Entity Recognition

Yinghao Li, Pranav Shetty, Lucas Liu, Chao Zhang, Le Song

In *ACL*, 2021.

Please visit [Google Scholar](#) for more publications.

PROJECTS

Large Language Models: Reasoning and Application

- Improves large language model's (LLM's) performance on diverse tasks through an Expert Ensembles framework, which clusters training data according to gradient profiles to reduce update conflicts and aggregates expert models' predictions according to their relevance to the input [[ELREA](#)].
- Studies the reasoning and planning abilities of LLMs to determine whether they genuinely exhibit reasoning or primarily rely on knowledge retrieval from their pre-training data [[Minesweeper](#)].

- Investigates efficient and effective LLM prompting and fine-tuning techniques for information extraction tasks such as named entity recognition and relation extraction [G&O].
- Leverages LLMs to synthesize or select relevant data points to fine-tune smaller, cost-effective, and domain/task-specific language models such as BERT [ProgGen].

Uncertainty Estimation for Molecular Property Prediction

- Develops the MUBen benchmark to assess the uncertainty quantification performance of different backbone models (including both state-of-the-art pre-trained models such as Uni-Mol and simple models such as GIN) and various uncertainty estimation methods for molecular property prediction [MUBen].

Weak Supervision for Information Extraction

- Designs a conditional hidden Markov model (CHMM) that conditions the Hidden Markov Model (HMM) on BERT token embeddings. This approach facilitates token-wise transition and emission probabilities for aggregating multiple sets of Named Entity Recognition (NER) labels from different weak labeling functions [CHMM; Wrench].
- Introduces a sparse variant—Sparse CHMM—as a followup to CHMM. Sparse CHMM predicts diagonal emission elements instead of entire emission matrices. This design helps regulate the emission process and reduces training complexity. The use of a WXOR function provides finer control over emission probabilities, resulting in improved performance with lower computational consumption [Sparse CHMM].

Syntactic-Guided Text Generation

- Designs a two-encoder Transformer architecture with a multi-encoder attention mechanism to effectively incorporate syntactic information represented by the constituency parsing trees into the text generation process [GuiG].

Please visit my [GitHub page](#) for more projects.

OTHER

- **Programming Skills:** *Proficient:* Python, C++; *Familiar:* Scala, Java, VHDL, and Assembly
- **Open-Source Python Packages:** [muben](#); [SeqLbToolkit](#); [ChemistryPaperParser](#)
- **Teaching Experience:** Teaching Assistant for *CSE 8803 Deep Learning for Text Data* (Fall 2023, 2024); *GT NLP Bootcamp: Natural Language Processing & Large Language Model* (Spring 2023, 2024); *Georgia Tech Big Data Analytics Bootcamp* (Spring 2020, 2021, 2022, 2023, 2024)
- **Hobbies:** [Photography](#), Hiking, Running, Reading, Table Tennis