

# MAN LUO

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## EDUCATION

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### Ph.D., Computer Science

*August 2018 - May 2023*

Arizona State University (ASU), Tempe, Arizona, USA

[Thesis: Neural Retriever-Reader for Information Retrieval and Question Answering](#)

Chair: Dr. Chitta Baral

Committee: Dr. Yezhou Yang, Dr. Eduardo Blanco, Dr. Danqi Chen

### Bachelor of Science, Computer Science

*September 2014 - July 2018*

Beijing Forestry University, Beijing, China

## RESEARCH AREA

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**Retrieval-Augmented Language Models and Multimodal Understanding and Learning. AI for Healthcare.**

## INDUSTRY RESEARCH EXPERIENCE

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### AI Research Scientist at Intel Lab

*March 2024 - Present*

Multimodal retrieval augmented generation, knowledge graph extraction, retrieval, and reasoning, multimodal behavior analysis and interpretability.

### Research Fellow at Mayo Clinic

*June 2023 - March 2024*

Conduct research on using language and multimodal models for biomedical tasks like radiology report generation and clinical note extraction.

### Research Intern at Google Research

*Aug 2022 - Dec 2022*

Utilized information retrieval models to enhance the few-shot in-context learning capabilities of large language models. Designed a retrieval model that achieved superior performance compared to existing models.

### Research Intern at Meta Reality Lab

*May 2022 - Aug 2022*

Developed an indexing-memory efficient hybrid retrieval model that improved generalization. Utilized adversarial attack methods to evaluate the robustness of various retrieval models.

### Research Intern at Salesforce.Inc

*May 2021 - Aug 2021*

Examined machine reading comprehension models, and evaluated the benefits and drawbacks of extractive and generative models through experimentation on 12 question answering datasets in both in-domain and out-of-domain scenarios.

## TEACHING/MENTORING

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### ASU Capstone Project Mentor

Detect and rewrite the toxicity in paper reviews, 5 students,

*Sep 2023 - Present*

### Ph.D. Mentor

Xiang Rui (Ph.D. Student at Arizona State University).

*Aug 2024 - Present*

Md Messal Monem Miah (Ph.D. Student at Texas A&M University).

*Oct 2023 - Present*

### Master Mentor

Sanyam Lakhanpal (Master Student at ASU).

*Oct 2023 - April 2024*

Shrinidhi Kumbhar (Master Student at ASU).

*Jan 2023 - June 2023*

Srija Macherla (SWE at Amazon).

*Jan 2022 - Jun 2022*

Yankai Zeng (Ph.D student at The University of Texas at Dallas).

*Aug 2020 - June 2021*

### NLP Course Project Mentor

Domain Oriented Question Generation, 26 students,

*Aug 2021 - Dec 2021*

Differential Diagnosis Dialogue Generation, 20 students,

*Aug 2021 - Dec 2021*

Semantic Information Availability (SIA) Task, 5 students,

*Jun 2020 - May 2020*

Question Answering with Varied Types of Reasoning, 5 students.

*Jun 2020 - May 2020*

**Teaching Assistant**

CSE259 Logic in Computer Science

*Dec 2020 - Dec 2021*

CSE579 Knowledge Representation and Reasoning

*Aug 2019 - Dec 2019*

CSE205 Object-Oriented Programming and Data Structures

*Aug 2018 - Dec 2018*

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**ACADEMIC SERVICE**

**Editor**, [PLOS Digital Health](#).

**Long-Term Super-Volunteers**, [WiML Workshop at NeurIPS 2024](#).

**Organizer**, [Multimodal4Health at ICHI 2024](#)

**Guest Editor**, [PLOS Digital Medicine](#).

**Organizer**, [O-DRUM at CVPR 2023](#).

**Organizer**, [O-DRUM at CVPR 2022](#).

**Reviewers**, ACL, NAACL, EMNLP, EACL, AAAI, Neurips, IROS.

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**INVITED TALK**

“Inspecting the Rise of Multimodal Through Retrieval and Content Generation Tasks” at UIUC	<i>Oct 2024</i>
“Synthetic Data for Generalization and Efficiency” at ASU	<i>Sep 2024</i>
“Retrieval Based In-context Learning for Large Language Models” at Google	<i>Mar 2024</i>
“Advancing Multimodal Retrieval and Generation” at UMBC	<i>Dev 2023</i>
“Transformer-based Multimodal Generative Model” at Mayo Clinic Radiology Showcase	<i>Nov 2023</i>
“The Trend of Transformer-based Multimodal in Radiology” at RSNA	<i>Nov 2023</i>
“Visual-Retriever-Reader for Knowledge-based Question Answering” at SERUM WACV	<i>Jan 2023</i>
“Semantic Searching in Biomedical Domain” at exploreCSR workshop (ASU).	<i>Mar 2021</i>

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**AWARD**

Finalist of 2021 Knowledge Mobilization Awards. <a href="#">Website</a>	<i>April 2021</i>
2019 ICLP conference Doctoral Consortium Travel Award. <a href="#">Website</a>	<i>September 2019</i>
Honorable Mention in Interdisciplinary Contest in Modeling(ICM)	<i>April 2017</i>

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**PUBLICATION**

- U Ghaffar, A Tariq, M Choudry, L Briggs, A Channar, I Banerjee, **M Luo** [Domain-specific large language model for predicting prostate cancer treatment plan](#) Journal of Clinical Oncology 2025.
- **Luo, M.** Warren, C., Cheng, Lu., Abdul-Muhsin, H., Banerjee, I. [Assessing Empathy in Large Language Models with Real-World Physician-Patient Interactions](#). IEEE BigData 2024.
- Lakhanpal, S., Chopra, S., Jain, V., Chadha, A., **Luo, M.** [Refining Text-to-Image Generation: Towards Accurate Training-Free Glyph-Enhanced Image Generation](#). WACV 2025.
- **Luo, M.**, Xu, X., Liu, Y., Pasupat, P., Kazemi. [In-context Learning with Retrieved Demonstrations for Language Models: A Survey](#). TMLR Journal 2024.
- **Luo, M. et al** [Automated Extraction of Patient-Centered Outcomes following Breast Cancer Treatment: An Open-Source Large Language Model-Based Toolkit](#). JCO Clinical Cancer Informatics 2024.
- Parmar, M., Patel, N., Varshney, N., Nakamura, M., **Luo, M.**, Mashetty, S., Mitra, A., Baral, C. [Towards Systematic Evaluation of Logical Reasoning Ability of Large Language Models](#). ACL 2024.
- Chiang, C. C., **Luo, M.**, Dumkrieger, G., Trivedi, S., Chen, Y. C., Chao, C. J., ... & Banerjee, I. [A Large Language Model-Based Generative Natural Language Processing Framework Finetuned on Clinical Notes Accurately Extracts Headache Frequency from Electronic Health Records](#). Headache: The Journal of Head and Face Pain 2024.

- **Luo, M.**, Xu, X., Dai, Z., Pasupat, P., Kazemi, M., Baral, C., ... Zhao, V. Y. **Dr. ICL: Demonstration-Retrieved In-context Learning**. NeurIPS 2023 Workshop R0-FoMo.
- **Luo, M.**, Tariq, A., Patel, B., Banerjee, I. **M3-X: Multimodal Generative Model for Screening Mammogram Reading and Explanation Medical Imaging Meets NeurIPS 2023**.
- Varshney, N., **Luo, M.**, Baral, C. **Exploring Training Objectives for Passage-level Differentiable Search Indexing** SocalNLP 2023.
- **Luo, M.**, Tariq, A., Patel, B., Banerjee, I. **Transformer-based Multimodal Generative Model: Use-case of Screening Mammogram Reading**. RSNA 2023.
- **Luo, M.** Fang, Z. Gokhale, T. Baral, C. **End-to-end Knowledge Retrieval with Multi-modal Queries**. ACL 2023.
- **Luo, M.**, Jain, S., Gupta, A., Einolghozati, A., Oguz, B., Chatterjee, D., Chen, X., Baral, C. and Heidari, P., 2022. **A Study on the Efficiency and Generalization of Light Hybrid Retrievers**. ACL 2023.
- Parmar, M., Mishra, S., Purohit, M., **Luo, M.**, Baral, C. **In-BoXBART: Get Instructions into Biomedical Multi-Task Learning**. NAACL 2022 Findings.
- Gokhale, T., Mishra, S., **Luo, M.**, Sachdeva, B., Baral, C. **Generalized but not Robust? Comparing the Effects of Data Modification Methods on Out-of-Domain Generalization and Adversarial Robustness**. ACL 2022 Findings.
- **Luo, M.**, Mitra, A., Gokhale, T., Baral, C. **Improving Biomedical Information Retrieval with Neural Retrievers**. AAAI 2022.
- **Luo, M.**, Zeng, Y., Banerjee, P., Baral, C. **Weakly-Supervised Visual-Retriever-Reader for Knowledge-based Question Answering**. EMNLP 2021.
- **Luo, M.** Sampat, S. Tallam, R. Zeng, Y. Vancha, M. Sajja, A. Baral, C. **Just because you are right, doesnt mean I am wrong: Overcoming a bottleneck in development and evaluation of Open-Ended VQA tasks**. EACL 2021.
- Lee, J. and **Luo, M.**, 2019. **Strong equivalence for LPMLN programs**. ICLP 2019.
- Varshney, N., **Luo, M.**, Baral, C. **Can Open-Domain QA Reader Utilize External Knowledge Efficiently like Humans?** AAAI 2023 Workshop on Knowledge Augmented Methods for NLP
- **Luo, M.**, Parmar, M., Mahendran, J. S., Jain, S., Rawal, S., Baral, C. **SCONER: Scoring Negative Candidates Before Training Neural Re-Ranker For Question Answering** ICML 2022 Workshop on Knowledge Retrieval and Language Models.
- **Luo, M.**, Saxena, S., Mishra, S., Parmar, M., Baral, C. **BioTABQA: Instruction Learning for Biomedical Table Question Answering** CEUR Workshop 2022.
- **Luo, M.** **Neural Retriever and Go Beyond: A Thesis Proposal**. NAACL 2022 Student Research Workshop.
- **Luo, M.**, Chen, S., Baral, C. **A Simple Approach to Jointly Rank Passages and Select Relevant Sentences in the OBQA Context** NAACL 2022 Student Research Workshop.
- **Luo, M.**, Hashimoto, K., Yavuz, S., Liu, Z., Baral, C., Zhou, Y. **Choose Your QA Model Wisely: A Systematic Study of Generative and Extractive Readers for Question Answering** ACL 2022 Spa-NLP workshop.

## PRE-PRINT

- ML Olson, N Ratzlaff, M Hinck, **M Luo**, S Yu, C Xue, V Lal **Semantic Specialization in MoE Appears with Scale: A Study of DeepSeek R1 Expert Specialization** arXiv preprint 2025.
- **M Luo**, B Peterson, R Gan, H Ramalingame, N Gangrade, A Dimarogona I Banerjee, P Howard **Benchmark on Peer Review Toxic Detection: A Challenging Task with a New Dataset** arXiv preprint 2025.

- E Aflalo, GBM Stan, T Le, **M Luo**, S Rosenman, S Paul, SY Tseng, V Lal [FiVL: A Framework for Improved Vision-Language Alignment](#) arXiv preprint 2025.
- N Ratzlaff, **M Luo**, X Su, V Lal, P Howard [Training-Free Mitigation of Language Reasoning Degradation After Multimodal Instruction Tuning](#) arXiv preprint 2025.
- G Ben-Melech Stan, E Aflalo, **M Luo**, S Rosenman, T Le, S Paul, SY Tseng, V Lal [FastRM: An efficient and automatic explainability framework for multimodal generative models](#) arXiv preprint 2025.
- PK Choubey, X Su, **M Luo**, X Peng, C Xiong, T Le, S Rosenman, V Lal, P Mui, R Ho, P Howard, CS Wu [Distill-SynthKG: Distilling Knowledge Graph Synthesis Workflow for Improved Coverage and Efficiency](#) arXiv preprint 2024.
- Su, X., **Luo, M.**, Pan, K., Chou, T., Lal, V., Howard, P. [SK-VQA: Synthetic Knowledge Generation at Scale for Training Context-Augmented Multimodal LLMs](#) arXiv preprint 2024.
- **Luo, M.**, Kumbhar, S., Parmar, M., Varshney, N., Banerjee, P., Aditya, S., Baral, C. [Towards LogiGLUE: A Brief Survey and A Benchmark for Analyzing Logical Reasoning Capabilities of Language Models](#). arXiv preprint 2023.
- Macherla, S., **Luo, M.**, Parmar, M., Baral, C. [MDDial: A Multi-turn Differential Diagnosis Dialogue Dataset with Reliability Evaluation](#). arXiv preprint 2023.
- **Luo, M.** [Neural Retriever-Reader for Information Retrieval and Question Answering](#) (Doctoral dissertation, Arizona State University, 2023).
- Varshney, N., Parmar, M., Patel, N., Handa, D., Sarkar, S., **Luo, M.**, Baral, C.. [Can NLP Models Correctly Reason Over Contexts that Break the Common Assumptions?](#). arXiv preprint 2023.
- Liu, Z., Chen, Y., Li, J., **Luo, M.**, Yu, P. S., Xiong, C. [Improving contrastive learning with model augmentation](#). arXiv preprint 2022.
- Banerjee, P., Baral, C., **Luo, M.**, Mitra, A., Pal, K., Son, T. C., Varshney, N. [Can Transformers Reason About Effects of Actions?](#) arXiv preprint, 2020.

## BOOK MANUSCRIPT

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**Luo, M.** Gokhale, T., Varshney, N., Yang, Y., Baral, C. [Advances in Multi-Modal Information Retrieval](#). Springer Nature