ADITYA SHARMA

Semi-parametric Reasoning | LLM Safety & Reliability | Knowledge Grounded NLP

MILA, Quebec | Polytechnique Montreal

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EDUCATION

Polytechnique Montréal / Mila - Quebec AI, Canada **Aug 2023 – Present**

PhD, Computer Engineering

Advisors: Dr. Amal Zouaq and Dr. Christopher J. Pal

Thesis Topic: "Semi-parametric Approaches For Eliciting Complex Reasoning From Language Models"

Birla Institute of Technology and Science, Pilani, India **Aug 2012 – June 2016**

B.E. (hons.) Electrical and Electronics Engineering

Advisors: Dr. Partha Talukdar (IISc, Bangalore / Google DeepMind) and Dr. Ashish Mishra (BITS, Pilani)

Thesis Topic: "Asynchronous Distributed Training for Knowledge Graph Embeddings"

PUBLICATIONS

- Luis Lara, ZhiHao Luo, Aristides Milios, Aditya Sharma, Ge Ya Luo, Christopher Beckham, Florian Golemo, Christopher Pal. *"Generative Floor Plan Design with LLMs via Reinforcement Learning with Verifiable Rewards."* **ACL Findings 2026**.
- Aditya Sharma, Christopher J. Pal, Amal Zouaq. *"Reducing hallucinations in language model-based SPARQL query generation using post-generation memory retrieval."* **EACL Findings 2026**.
- Luis Lara, ZhiHao Luo, Aristides Milios, Aditya Sharma, Ge Ya Luo, Christopher Beckham, Florian Golemo, Christopher J. Pal. *"Generative Floor Plan Design with LLMs via Reinforcement Learning with Verifiable Rewards."* 39th Conference on Neural Information Processing Systems **(NeurIPS 2025) Workshop: UrbanAI**.
- Aditya Sharma, Aman Dalmia, Mehran Kazemi, Amal Zouaq, Christopher J. Pal. *"GeoCoder: Solving Geometry Problems by Generating Modular Code through Vision-Language Models."* **NAACL Findings 2025**.
- Aditya Sharma, Apoorv Saxena, Chitrank Gupta, Seyed Mehran Kazemi, Partha Talukdar, Soumen Chakrabarti. *"TwiRGCN: Temporally Weighted Graph Convolution for Question Answering over Temporal Knowledge Graphs."* **EACL, 2023**.
- Chandrahas, Aditya Sharma, Partha Talukdar. *"Towards Understanding the Geometry of Knowledge Graph Embeddings."* **ACL, 2018**.
- Aditya Sharma, Zarana Parekh, Partha Talukdar. *"Speeding up Reinforcement Learning-based Information Extraction Training using Asynchronous Methods."* **EMNLP, 2017**.
- Aditya Sharma, Pranet Verma, Ashish Mishra, K. Solomon Raju. *"A Modular Approach to Random Task Graph Generation."* Indian Journal of Science and Technology, 2016.

RESEARCH EXPERIENCE

Polytechnique Montréal / MILA, Canada **Aug 2023 – Present**

Advisors: Dr. Amal Zouaq and Dr. Christopher J. Pal

Doctoral Student Researcher

- Developed **PGMR** (Post-Generation Memory Retrieval), a semi-parametric SPARQL generation framework that nearly **eliminated URI hallucinations** while effectively refusing unsupported queries by **offloading entity resolution to a non-parametric memory module** with a retrieval confidence threshold post-generation. Published in *EACL 2026 Findings*.
- Developed **GeoCoder**, a framework for **multimodal geometric reasoning** that significantly improved VLM accuracy by transitioning **from stochastic token prediction to deterministic code executio**n. By introducing **RAG-GeoCoder**, we integrated a non-parametric memory module to **retrieve complex geometry functions** from a predefined library, reducing reliance on parametric memory. Published in *NAACL Findings 2025***.**
- Contributed to a reinforcement learning-based floor plan generation system using LLMs with verifiable reward signals, accepted to *ACL Findings 2026* and *NeurIPS 2025 UrbanAI Workshop*.

Indian Institute of Technology (IIT) Bombay, India **July 2022 – Aug 2023**

Advisor: Dr Soumen Chakrabarti

Research Assistant

- Collaborated with **Google Research** on helping machines do better **temporal reasoning**, extending our previous work on temporal question answering *(TwiRGCN- EACL 2023)*.
- Worked with **IBM Research** on **open domain question answering** over multimodal data (tables + text).

Indian Institute of Science (IISc) Bangalore, India **July 2017 – Nov 2021**

Advisor: Dr Partha Talukdar

Research Master's Candidate

- Used the **representation geometry** of created vector spaces **to analyze different KG embedding methods,** where we found principled differences in the vector spaces of models with an additive score function like TransE and ones with a multiplicative score function like ComplEx. Published in *ACL 2018*.
- Did courses on Deep Learning (DL) for NLP, DL for Computer Vision, Machine Learning with Large Datasets, Optimization, and Data Analytics.

Intuit IDC, India **June 2018 – July 2018 | May 2019 – July 2019**

Research Intern

- Built an unsupervised **query-focused summarization** system to create targeted summaries from Google News articles.
- Worked on building an **adversarial reinforcement learning-based conversational agent** for automating Intuit's Customer Care.

Indian Institute of Science (IISc) Bangalore, India **Aug 2016 – June 2017**

Advisor: Dr Partha Talukdar

Research Assistant

- Worked on applications of **Deep Reinforcement Learning in NLP**. Specifically, worked on automating parts of the Knowledge Graph generation pipeline and adapted the actor-critic model for information extraction. Published in *EMNLP 2017*.

CERN (European Organization for Nuclear Research), Switzerland **May 2016 – Aug 2016**

Intern (Google Summer of Code)

- Added support for compressed Deep Neural Networks along the lines of HashedNets to ROOT, an open source software for data analysis used by the High Energy Physics community.

IISc Bangalore, India **May 2015 – July 2015 | Dec 2015 – May 2016**

Advisor: Dr Partha Talukdar

Research Intern

- Implemented **distributed knowledge graph representation learning models (TransE)** on the **Cray XC40 supercomputer** SahasraT (fastest in India at the time) using MPI-OpenMP.
- Worked on an asynchronous parallel implementation of Stochastic Gradient Descent (SGD). Developed a Parameter Server infrastructure on Cray XC40, from scratch in MPI-OpenMP.

SKILLS

Programming: Python • PyTorch • Transformers • Unsloth • vLLM

REVIEWER

• **ACL** (2026, 2025, 2024, 2023) • **EACL** (2026, 2023) • **ICLR** (2025) • **NAACL** (2025) • **EMNLP** (2024, 2023, 2022)