

Prabin Bhandari

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RESEARCH INTERESTS

Large Language Models, Agentic AI, Geospatial NLP, Generative Agent-Based Simulation, Information Extraction, Spatial Reasoning, Low-Resource NLP, Machine Learning

EDUCATION

George Mason University

Fairfax, Virginia, USA

Ph.D. in Computer Science

August 2021 – Present (Expected: December 2026)

Dissertation Proposal: Scalable Mini-World: LLM-Based Agentic System for Scalable Urban Mobility Modeling

M.S. in Computer Science (Machine Learning Concentration)

2024

Pulchowk Campus, Tribhuvan University

Pulchowk, Lalitpur, Nepal

Bachelors in Computer Engineering

2013 – 2017

RESEARCH AND PROFESSIONAL EXPERIENCE

Research Assistant

2023 – Present

George Mason University

Fairfax, Virginia, USA

- **Geospatial Knowledge & Probing in LLMs:** Evaluated the spatial awareness and reasoning capabilities of foundation language models by designing probing tasks for coordinate prediction, spatial prepositions, and geographic distance estimation.
- **LLM-Based Urban Mobility & Travel Survey Synthesis:** Developed methods to generate realistic synthetic travel diaries using prompted and fine-tuned LLMs; established multi-level evaluation metrics (activity chains, trip transitions, and travel times) to benchmark against national travel datasets across multiple US cities.
- **City-Scale Generative LLM Agent Simulation (UrbanLLMind):** Built a city-scale simulation framework where thousands of autonomous LLM agents navigate a realistic virtual environment, generating daily plans, making step-by-step mobility decisions, and maintaining persistent memories using open-weight models on local GPU clusters.
- **Multi-Agent Social Dynamics & Reinforcement Learning (*Ongoing*):** Expanding the simulation framework to support household and community coordination (family routines, child care and school drop-offs, vehicle sharing, and friendship networks), applying reinforcement learning to optimize LLM agent policies from simulation feedback and population distributions.

Research Intern

May 2024 – May 2025

Oak Ridge National Laboratory (ORNL)

Oak Ridge, TN & Remote

- **Automated Data Extraction with LLMs:** Built an automated pipeline using LLMs to extract structured event data (disease outbreaks, case counts, dates, and locations) from unstructured scientific literature and reports.
- **Context-Aware Geotagging & Location Resolution:** Utilized LLMs alongside global administrative databases (GADM) to disambiguate and geotag extracted locations with reasoning steps, creating high-resolution spatial datasets with minimal manual effort.

Teaching Assistant

2021 – 2023

George Mason University

Fairfax, Virginia, USA

- Served as Teaching Assistant for graduate and undergraduate courses: *CS 678: Advanced Natural Language Processing*, *CS 499: Natural Language Processing (NLP)*, *CS 450: Database Concepts*, *CS 112: Introduction to Computer Programming*, and *CS 110: Essentials of Computer Science*.
- Led lab sessions, held weekly office hours, and graded assignments.

Senior Software Engineer

Assurance IQ, LLC

2020 – 2021

Remote

- Developed full-stack web applications and scalable backend microservices supporting high-throughput insurance policy matching, automated customer onboarding workflows, and carrier integrations.

Course Instructor

Swastik College

2018 – 2021

Madhyapur Thimi, Nepal

- Delivered undergraduate lectures for courses: *CSC 410: Data Warehousing and Data Mining*, *CSC 370: E-Commerce*, *CSC 321: Image Processing*, *CSC 261: Artificial Intelligence*, and *CSC 209: Computer Graphics*.
- Supervised undergraduate senior capstone theses and semester projects.

Co-founder and Python Instructor

Line Academy

2018 – 2020

Pulchowk, Nepal

- Co-founded the academy, designed Python programming curricula, and trained students and professionals in software development and data fundamentals.

Co-founder and Software Engineer

TechKunja Pvt. Ltd.

2015 – 2020

Pulchowk, Nepal

- Co-founded the software company, served as Project Manager and backend developer across client and in-house digital products, and led engineering teams.

PEER-REVIEWED
PUBLICATIONS

Bhandari, P., Reia, S. M., Pfoer, D., & Anastasopoulos, A. (2026). UrbanLLMind: Scalable LLM-Powered Urban Mobility Simulation with Open-Weight Models. In *Proceedings of the Conference on Language Modeling (COLM 2026)*. [\[To be published\]](#)

Bhandari, P., Anastasopoulos, A., & Pfoer, D. (2026). Behaviorally Realistic Urban Mobility Synthesis via Fine-Tuned Large Language Models. *ACM Transactions on Spatial Algorithms and Systems (TSAS)*, 12(4), Article 19, 33 pages. [doi:10.1145/3816246](https://doi.org/10.1145/3816246)

Bhandari, P., Anastasopoulos, A., & Pfoer, D. (2024). Urban Mobility Assessment Using LLMs. In *Proceedings of the 32nd ACM International Conference on Advances in Geographic Information Systems (SIGSPATIAL '24)*, 67–79. Presented at Atlanta, GA, USA. [doi:10.1145/3678717.3691221](https://doi.org/10.1145/3678717.3691221) **[Best Paper Award]**

Harrod, K.*, **Bhandari, P.***, & Anastasopoulos, A. (2024). From Text to Maps: LLM-Driven Extraction and Geotagging of Epidemiological Data. In *Proceedings of the Third Workshop on NLP for Positive Impact (NLP4PI @ EMNLP 2024)*, 258–270. [\[PDF\]](#) **[Outstanding Paper Award]** (*Equal contribution)

Bhandari, P., Anastasopoulos, A., & Pfoer, D. (2023). Are Large Language Models Geospatially Knowledgeable? In *Proceedings of the 31st ACM International Conference on Advances in Geographic Information Systems (SIGSPATIAL '23)*. Presented at Hamburg, Germany. [doi:10.1145/3589132.3625625](https://doi.org/10.1145/3589132.3625625)

Bhandari, P., & Brennan, H. (2023). Trustworthiness of Children Stories Generated by Large Language Models. In *Proceedings of the 16th International Natural Language Generation Conference (INLG '23)*, 352–361. [\[PDF\]](#)

PRE-PRINTS

Bhandari, P. (2024). A Survey on Prompting Techniques in LLMs. [arXiv:2312.03740](https://arxiv.org/abs/2312.03740)

Bhandari, P., & Paudel, A. (2024). Using Contextual Information for Sentence-level Morpheme Segmentation. [arXiv:2403.15436](https://arxiv.org/abs/2403.15436)

Adhikari, B., & **Bhandari, P.** (2023). Estimation of Vehicular Velocity based on Non-Intrusive stereo camera. [arXiv:2304.05298](https://arxiv.org/abs/2304.05298)

SKILLS

- **Programming Languages:** Python, C/C++, Ruby, Java, JavaScript, MATLAB, SQL.
- **Libraries & Frameworks:** PyTorch, TensorFlow, Hugging Face Transformers, vLLM, NeMo, NumPy, Pandas, Matplotlib, Scikit-learn, Stanza, Elasticsearch.
- **Databases:** MySQL, PostgreSQL, MongoDB, Neo4j.
- **Web Development:** HTML, CSS, Django, Ruby on Rails, React.
- **Tools & Systems:** Git, L^AT_EX, Docker, Kubernetes, HPC / Slurm, Repast4Py, OSMnx.
- **Languages:** Nepali (Native), English (Fluent), Hindi.

AWARDS,

ACHIEVEMENTS,

AND PROFESSIONAL

AFFILIATIONS

Outstanding PhD Student Award, GMU CS Department	2025
Distinguished Academic Achievement Award, GMU CS Department	2025
Best Paper Award, ACM SIGSPATIAL	2024
Outstanding Paper Award, Workshop on NLP for Positive Impact (NLP4PI @ EMNLP)	2024
SIGSPATIAL NSF Travel Award	2024
GMU's Graduate Student Travel Fund	2023, 2024
Reviewer, ACL Rolling Review (ARR)	2023 – Present
Marketing Manager, LOCUS	2017
Board Member, Sano Sansar Initiative	2015 – 2017
Recipient of Civil Employee Children's Scholarship for undergraduate education	2014
Volunteer, National Population Census 2011, Government of Nepal	2011

REFERENCES

Dr. Antonios Anastasopoulos

antonis@gmu.edu

Assistant Professor, Department of Computer Science (CS)
George Mason University, Fairfax, VA

Dr. Dieter Pfoser

dpfoser@gmu.edu

Professor, Department of Geography & Geoinformation Science (GGS)
George Mason University, Fairfax, VA