

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 spatial awareness of foundation language models via probing tasks for coordinate prediction, spatial prepositions, and geographic distance.
- **LLM-Based Urban Mobility & Survey Synthesis:** Synthesized realistic travel diaries using prompted and fine-tuned LLMs; established multi-level evaluation metrics benchmarking against national datasets.
- **City-Scale Generative Agent Simulation (UrbanLLMind):** Built a city-scale simulation where thousands of autonomous LLM agents navigate virtual environments, generate daily plans, make step-by-step mobility decisions, and maintain persistent memory using open-weight models on GPU clusters.
- **Multi-Agent Social Dynamics & Reinforcement Learning (*Ongoing*):** Modeling household/community coordination (routines, school drop-offs, vehicle sharing), using RL to optimize LLM policies.

Research Intern

May 2024 – May 2025

Oak Ridge National Laboratory (ORNL)

Oak Ridge, TN & Remote

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

Teaching Assistant

2021 – 2023

George Mason University

Fairfax, Virginia, USA

- Served as TA for graduate/undergraduate courses: *CS 678: Advanced NLP*, *CS 499: NLP*, *CS 450: Database Concepts*, *CS 112: Intro to Programming*, and *CS 110: Essentials of CS*; led labs and graded assignments.

Senior Software Engineer

2020 – 2021

Assurance IQ, LLC

Remote

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

Co-founder and Software Engineer

2015 – 2020

TechKunja Pvt. Ltd.

Pulchowk, Nepal

- Co-founded the company; served as Project Manager and backend developer across digital products and client solutions.

PEER-REVIEWED
PUBLICATIONS

Bhandari, P., Reia, S. M., Pfoser, 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., & Pfoser, 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](#)

Bhandari, P., Anastasopoulos, A., & Pfoser, 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](#) [\[Best Paper Award\]](#)

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., & Pfoser, 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. [\[PDF\]](#)

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](#)

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

Adhikari, B., & **Bhandari, P.** (2023). Estimation of Vehicular Velocity based on Non-Intrusive stereo camera. [arXiv: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