

# Shishir Adhikari

Chicago, IL, USA

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## PROFESSIONAL SUMMARY

Ph.D. candidate in computer science with research interests in the intersection of causal inference, machine learning, and artificial intelligence specializing in causal Bayesian modeling and causal inference in networks. Prior software and data engineering experience in business domains (healthcare, real estate, and IOT) utilizing big data analytics and distributed systems. Seeking a faculty position that involves innovative and impactful research in artificial intelligence and causal inference in network settings and its applications for decision-making in business, healthcare, and social science.

## EDUCATION

**Doctor of Philosophy, Computer Science, University of Illinois Chicago (UIC) - Chicago, IL**

*Aug 2018 - May 2025*

**Focus:** Causal inference under interference, Heterogeneous causal effects, Causal discovery, Network interventions

**Thesis:** Discovering heterogeneous causal effects in relational data

**Advisor:** Dr. Elena Zheleva

**Relevant Courses:** Machine Learning (ML), Computer Algorithms, Artificial Intelligence (AI), Research Methods in Computer Science, Causal Inference and Learning, Data and Web Semantics, Advanced Machine Learning, Algorithmic Fairness and Responsible Data Science, Statistical Natural Language Processing (NLP)

**Bachelor of Engineering in Electronics and Communication, Tribhuvan University - Nepal**

*Nov 2010 - Nov 2014*

**Relevant courses:** Image Processing and Pattern Recognition, AI, Database Management Systems, Economics

## RESEARCH EXPERIENCE

**Research Assistant, University of Illinois Chicago, Department of Computer Science - Chicago, IL**

*May 2020 - Present*

- Working under the supervision of Dr. Elena Zheleva at EDGES lab, a statistical relational learning and data science lab, on research at the intersection of causal inference, machine learning, and knowledge discovery
- Developed social network opinion analysis pipeline followed by a quasi-experimental causal inference framework to test causal hypotheses in the public health policy domain utilizing Twitter data that resulted in a first-author paper.
- Proposed a practical causal discovery framework for the automated discovery of multiple causal-effect hypotheses and applied it to healthcare data for mining factors triggering and preventing repeat emergency room visits and hospital readmissions, resulting in a first-author paper under submission.
- Collaborated with the civil engineering department to travel mode preferences using causal structure learning and structural equation model resulting in a paper.
- Investigated causal modeling and estimation for interacting units with heterogeneous peer influence and developed graph neural network-based causal effect estimation in networks resulting in a first-author paper.

## TEACHING EXPERIENCE

**Graduate Teaching Assistant, University of Illinois Chicago, Department of Computer Science - Chicago, IL**

*Aug 2018 - May 2020*

- Assisted teaching Machine Organization (Fall 19, Spring 19, Fall 18) and Introduction to Data Science (Spring 20) courses by conducting weekly labs, preparing and grading assignments, tutoring students, and proctoring exams.

- Received great feedback from students and "Outstanding Graduate Teaching Assistant Award 2020" from the Computer Science department.

## EMPLOYMENT

### **Freelance Software and Data Engineer, Self-Employed Contractor via Upwork - Remote**

*May 2017 - Aug 2018*

- Worked with co-founders to develop a data analytics framework using Apache Spark streaming and Apache Cassandra for processing time-series data from IoT sensors in Building Heating, Ventilation, and Air Conditioning (HVAC) Systems that resulted in a startup nube-io.com (Australia-based client).
- Won competitive contracts and timely delivered the products and services to earn 5-star ratings from clients globally (Indonesia, South Africa, UK, and US) on projects like custom search, autocomplete, and recommendation engines as well as secondary marketplace web services using Elasticsearch and Groovy on Grails.

### **Lead Software and Data Engineer, Yotcha Inc (startup) - Remote**

*Aug 2016 - Aug 2017*

*Yotcha Services Pvt. Ltd., Kathmandu Nepal*

- Led a team of 5-10 software developers in a start-up environment and developed a web application and data processing framework for real-estate property listing and search, market data analytics, and agent services platform that resulted in the start-up platform being [featured on "The Straits Times"](#), a prominent media in Singapore.
- Implemented new property price index (PPI) estimation and property price evaluation methodology by combining big data analytics and machine learning with comparative market analysis methods that improved median price deviation performance in held-out future data.

### **Software Engineer, Deerwalk Inc (Acquired by Cedar Gate Technologies Inc) - Remote**

*Feb 2015 - Jul 2016*

- Wrote Hadoop MapReduce jobs using Cascading framework for cleaning US healthcare data and applying business rules and developed web services using Groovy on Grails framework as well as Elasticsearch mappings, queries, and aggregations to generate dynamic, on-the-fly, healthcare-related reports for planning cost and quality of care.

## TECHNICAL SKILLS

**Skills:** Causal Inference, Causal Discovery, Machine Learning, Deep Learning, Network Analysis, Graph Neural Networks, Big Data Analytics, NLP, Information Retrieval, Databases, Distributed Systems, Web Development

**Tools and Technologies:** Pytorch, Tensorflow, Apache Spark, Spark Streaming, Hadoop, Hive, Apache Cassandra, Elasticsearch, Pyspark, Pandas, Scikit-learn, Keras, Jupyter notebook, Zeppelin, Graph database (Neo4j), Matlab, Groovy on Grails, SQL, Html/CSS, Git, Docker, AWS, Google Cloud Platform, RESTful API

**Programming Languages:** Python, Java, C, C++, R

## PUBLICATIONS

- **Shishir Adhikari**, Akshay Uppal, Robin Mermelstein, Tanya Berger-Wolf, Elena Zheleva. *Understanding the Dynamics between Vaping and Cannabis Legalization Using Twitter Opinions*. [AAAI ICWSM 2021](#).
- **Shishir Adhikari**, Guido Muscioni, Mark Shapiro, Plamen Petrov, Elena Zheleva. *Ensemble Causal Discovery for Identifying Preventive and Risk Factors of Patient Outcomes*. 2023. (Under revision)
- Rishabh Singh Chauhan, Christoffer Riis, **Shishir Adhikari**, Sybil Derrible, Elena Zheleva, Charisma F Choudhury, Francisco Camara Pereira. *Determining causality in travel mode choice*. [Travel Behaviour and Society 2024](#).
- **Shishir Adhikari**, Elena Zheleva. *Inferring Individual Direct Causal Effects Under Heterogeneous Peer Influence*. [Machine Learning Journal 2025](#). Extended abstract at [IEEE Data Science and Advanced Analytics 2024](#).

- **Shishir Adhikari.** Discovering heterogeneous causal effects in relational data. [AAAI Doctoral Consortium 2024.](#)
- **Shishir Adhikari,** Sourav Medya, Elena Zheleva. *Learning Exposure Mapping Function for Peer Effect Estimation.* 2024. (working paper) To appear at AAAI 2025 Workshop on Artificial Intelligence with Causal Techniques.

## PRESENTATIONS / POSTERS

- “*Causal Inference under Interference*” Guest Lecture for the Causal Inference and Learning course, taught by Dr. Elena Zheleva, at UIC, Chicago, IL (Fall 2024 and Fall 2023).
- “*Inferring Individual Direct Causal Effects Under Heterogeneous Peer Influence*” Poster at the Foundations of Fairness, Privacy, and Causality in Graphs Workshop, Santa Cruz, CA (October 2023).
- “*Causal Inference under Heterogeneous Peer Influence*” Presentation and Poster at KDD’23 PhD Consortium, Long Beach, CA (August 2023).
- “*Causal Inference for Policy Evaluation in Network Data*” Presentation and Tutorial at Institute for Data, Econometrics, Algorithms, and Learning (IDEAL) Workshop, Chicago, IL (Jun 2023).
- “*Quasi-Experimental Methods in Causal Inference*” Guest Lecture for the Causal Inference and Learning course, taught by Dr. Elena Zheleva, at UIC, Chicago, IL (Fall 2022).
- “*Inferring Causal Effects in Network under Heterogeneous Peer Influence*” Poster at the Midwest Machine Learning Symposium, Chicago, IL (May 2022).

## PROFESSIONAL MEMBERSHIP

- AAAI
- IEEE Computational Intelligence Society (CIS)
- Society for Causal Inference (SCI)

## SERVICES

- Jun’23: Mentored undergraduate students on the research topic “Causal inference for policy evaluation in network data” in the [3-day workshop](#) organized by the Institute for Data, Econometrics, Algorithms, and Learning (IDEAL).
- Journal and conference Reviewer: Frontiers in Big Data’21, ICWSM’22&24, AAAI’22&24&25, Royal Society A’23, Web Conf (WWW)’24, DSAA’24
- 2012-2014: Lead Robotics Club to organize workshops as well as volunteered in engineering expositions

## AWARDS

- AAAI’25 Scholarship and Volunteer Program Travel Award
- Travel Award for AAAI’24 Doctoral Consortium
- “Outstanding Graduate TA Award” 2020 by the Department of Computer Science, UIC
- Singapore International Graduate Award (SINGA) 2017 to visit the Agency for Science, Technology, and Research (A-STAR) and Nanyang Technological University, Singapore for an interview
- First Runner up, 6th National Robot Competition 2012, Kathmandu, Nepal