

Lu Cheng

Responsible and Reliable AI & Causal Machine Learning& AI for Good

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Education

Arizona State University

PH.D. IN COMPUTER SCIENCE

Tempe, USA

Aug. 2017 - May 2022

Rensselaer Polytechnic Institute

M.ENG. IN INDUSTRIAL ENGINEERING

Troy, USA

Aug. 2015 - May 2017

Huazhong University of Science and Technology

B.S. IN LOGISTICS & SYSTEMS ENGINEERING

Wuhan, China

Sep. 2011 - June 2015

Work Experience

Department of Computer Science, UIC

ASSISTANT PROFESSOR

Assistant Professor

Aug. 2022- Present

Data Mining and Machine Learning Lab, ASU

ADVISOR: HUAN LIU

Post-doc

June 2022 - Aug. 2022

IBM Research

MANAGER: KUSH R. VARSHNEY

Research Intern

June 2020 - Aug. 2020

Microsoft Research

MENTOR: GAVIN SMYTH

Research Intern

June 2017 - Aug. 2017

Tutorials & Invited Talks

- [1] Algorithmic Fairness in an Uncertain World, AAAI New Faculty Highlight, 2024 Feb.
- [2] Algorithmic Fairness in an Uncertain World, CS seminar series at Case Western Reserve University, 2023 Oct.
- [3] Algorithmic Fairness in an Uncertain World, NSF Tripods Workshop on Privacy, Fairness and Causality in Graphs, 2023 Oct.
- [4] Applied Causal Inference with Surrogate Representations, PCIC, 2023 Sept.
- [5] Applied Causal Inference with Surrogate Representations, LMU Munich, 2023 July.
- [6] Algorithmic Fairness in an Uncertain World, Midwest Machine Learning Symposium, 2023 May.
- [7] Causal Inference with Surrogate Representations in Practice, AGI Group@CMU, 2023 April.
- [8] "Sequential Bias Mitigation and the Need for Causal Fairness"
BIHE Monthly Seminar UIC, 2022 Oct.
- [9] "Sequential Bias Mitigation and the Need for Causal Fairness"
Seminar at Center for CBQB UIC, 2022 Oct.
- [10] "A Glance at Algorithmic Intersectionality", MLNLP, 2022 Sept.
- [11] "Advancing Cyberbullying Detection with Psychology Insights and Complex Media"
AI For Mankind, 2022
- [12] **Lu Cheng**, Fred Morstatter, H. V. Jagadish, Huan Liu, "Socially Responsible AI for Data Mining: Theories and Practice", SDM 2022
- [13] "Algorithmic Solutions for Socially Responsible AI", IBM Research 2021
- [14] "Causal Understanding of Fake News Dissemination On Social Media", Tsinghua AI TIME 2021

- [15] “Combating Cyberbullying and Disinformation on Social Media: The Roles of Socially Responsible AI”, IJCAI Workshop MAISoN 2021
- [16] “Socially Responsible AI Algorithms: Issues, Purposes, and Challenges”, UNT 2021
- [17] **Lu Cheng**, Fred Morstatter, Huan Liu, “Socially Responsible AI Algorithms: Issues, Purposes, and Challenges”, SBP-BRIMS 2021

Publications

Books/Book Chapters

- [1] Socially Responsible AI: Theories and Practice. **Lu Cheng** and Huan Liu. The World Scientific. 2023
- [2] Causal Inference and Machine Learning (in Chinese). Ruocheng Guo, **Lu Cheng**, Hao Liu, and Huan Liu. 2022

Conference and Journal Publications

- [1] Zhen Tan, **Lu Cheng**, Song Wang, Bo Yuan, Jundong Li, and Huan Liu, “Interpreting Pretrained Language Models via Concept Bottlenecks”, in PAKDD’24
- [2] Qianru Wang, Bin Guo, **Lu Cheng**, and Zhiwen Yu, “sUrban: Stable Prediction for Unseen Urban Data from Location-based Sensors”, in UbiComp’23
- [3] Fangxin Wang, **Lu Cheng**, Ruocheng Guo, Zekuan Liu, and Philip S. Yu, “Equal Opportunity of Coverage in Fair Regression”, in NeurIPS’23
- [4] Tianyi Zhao, Hui Hu, and **Lu Cheng**. Unveiling the Role of Message Passing in Dual-Privacy Preservation on GNNs. In CIKM’23
- [5] Anique Tahir, **Lu Cheng**, and Huan Liu. “Fairness through Aleatoric Uncertainty”. In CIKM’23
- [6] Song Wang, Jing Ma, **Lu Cheng**, and Jundong Li. “Fair Few-shot Learning with Auxiliary Sets”, In ECAI’23
- [7] Kenya Andrews, Bhuvani Shah, and **Lu Cheng**, “Intersectionality and Testimonial Injustice in Medical Records” In ACL’23 Clinical NLP Workshop
- [8] Usman Gohar and **Lu Cheng**. A Survey on Intersectional Fairness in Machine Learning: Notions, Mitigation, and Challenges. In IJCAI’23 Survey Track
- [9] Paras Sheth, Ruocheng Guo, **Lu Cheng**, Kasim Selcuk Candan, and Huan Liu, “Causal Disentanglement for Implicit Recommendations with Network Information”, In ACM TKDD’23
- [10] Qianru Wang, Bin Guo, **Lu Cheng**, Zhiwen Yu, and Huan Liu, “CausalSE: Understanding Varied Spatial Effects with Missing Data Towards Adding New Bike-sharing Stations”, in ACM TKDD’23
- [11] Anique Tahir, **Lu Cheng**, Ruocheng Guo, and Huan Liu, “Distributional Shift Adaptation using Domain-Specific Features”, In IEEE BigData’22 (Short Paper Track)
- [12] Ujun Jeong, Kaize Ding, **Lu Cheng**, Ruocheng Guo, Kai Shu, and Huan Liu, “Nothing Stands Alone: Leveraging News Relations through a Hypergraph for Fake News Detection”, In IEEE Big-Data’22
- [13] **Lu Cheng**, Nayoung Kim, and Huan Liu, “Debiasing Word Embeddings with Nonlinear Geometry”, in COLING’22
- [14] Ujun Jeong, Zeyad Alghamdi, Kaize Ding, **Lu Cheng**, Baoxin Li, and Huan Liu, “Classifying COVID-19 related Meta Ads using Discourse Representation through Hypergraph” In SBP-BRIMS’22
- [15] Paras Sheth, Ruocheng Guo, Kaize Ding, **Lu Cheng**, Huan Liu, and KS Candan, “Causal Disentanglement with Network Information for Debaised Recommendations”, SISAP 2022

- [16] Nayoung Kim, Ahmadreza Mosallanezhad, **Lu Cheng**, and Huan Liu, “Bridging the Gap: Commonality and Differences between Online and Offline COVID-19 Data”, in SBP-BRiMS’22
- [17] Anique Tahir, **Lu Cheng**, Paras Sheth, and Huan Liu, “Improving Vaccine Stance Detection by Combining Online and Offline Data”, in SBP-BRiMS’22
- [18] **Lu Cheng**, Ahmadreza Mosallanezhad, Yasin Silva, Deborah Hall, and Huan Liu, “Bias Mitigation for Toxicity Detection via Sequential Decisions”, in SIGIR’22
- [19] **Lu Cheng**, Ruocheng Guo, Raha Moraffah, Paras Sheth, Kasim Selçuk Candan, and Huan Liu, “Evaluation Methods and Measures for Causal Learning Algorithms”, in IEEE TAI’22
- [20] Hui Hu, **Lu Cheng**, Jayden Parker Vap, and Mike Borowczak, “Learning Privacy-Preserving Graph Convolutional Network with Partially Observed Sensitive Attributes”, in WWW’22
- [21] **Lu Cheng**, Ruocheng Guo, and Huan Liu, “Estimating Causal Effects of Multi-Aspect Online Reviews with Multi-Modal Proxies”, in WSDM’22
- [22] **Lu Cheng**, Ruocheng Guo, and Huan Liu, “Causal Mediation Analysis with Hidden Confounders”, in WSDM’22
- [23] **Lu Cheng**, Ruocheng Guo, Kasim Selçuk Candan, and Huan Liu, “Effects of Multi-Aspect Online Reviews with Unobserved Confounders: Estimation and Implication”, in ICWSM 2022
- [24] Qianru Wang, Bin Guo; Yi Ouyang, **Lu Cheng**, Liang Wang, Zhiwen Yu, and Huan Liu, “Learning Shared Mobility-aware Knowledge for Multiple Urban Travel Demands”, in IEEE IoT 2021
- [25] Bohan Jiang, Mansooreh Karami, **Lu Cheng**, Tyler Black, and Huan Liu, “Mechanisms and Attributes of Echo Chambers in Social Media”, in SBP-BRiMS Working Paper 2021
- [26] Deborah L. Hall, Yasin N. Silva, Brittany Wheeler, **Lu Cheng**, and Kathleen Baumel, “Harnessing the Power of Interdisciplinary Research with Psychology-Informed Cyberbullying Detection Models”, in International Journal of Bullying Prevention 2021
- [27] **Lu Cheng**, Kush R. Varshney, and Huan Liu, “Socially Responsible AI Algorithms: Issues, Purposes, and Challenges”, in Journal of Artificial Intelligence Research 2021
- [28] **Lu Cheng**, Ruocheng Guo, Kai Shu, and Huan Liu, “Causal Understanding of Fake News Dissemination on Social Media”, in KDD 2021
- [29] **Lu Cheng***, Ahmadreza Mosallanezhad*, Yasin Silva, Deborah Hall, and Huan Liu, “Mitigating Bias in Session-based Cyberbullying Detection: A Non-Compromising Approach”, in ACL 2021
- [30] **Lu Cheng**, Ahmadreza Mosallanezhad*, Paras Sheth*, and Huan Liu, “Causal Learning for Socially Responsible AI”, in IJCAI (survey track) 2021
- [31] Suyu Ge, **Lu Cheng**, and Huan Liu, “Improving Cyberbullying Detection with User Interaction”, in the Web Conference 2021
- [32] **Lu Cheng**, Ruocheng Guo, and Huan Liu, “Long Term Effect Estimation with Surrogate Representation”, in WSDM 2021
- [33] **Lu Cheng**, Ruocheng Guo, Yasin N. Silva, Deborah Hall, and Huan Liu, “Modeling Temporal Patterns for Cyberbullying Detection”, in ACM/IMS Transactions on Data Science 2021
- [34] **Lu Cheng**, Dmitriy Katz-rogozhnikov, Ioana Baldini, and Kush R. Varshney, “Automated Meta-Analysis in Medical Research: A Causal Learning Perspective”, in ACM CHIL Workshop 2021
- [35] **Lu Cheng**, Yasin N. Silva, Debora Hall, and Huan Liu, “Session-based Cyberbullying Detection: Problems and Challenges”, in IEEE Internet Computing Special Issue 2020
- [36] **Lu Cheng**, Kai Shu, Siqi Wu, Yasin N. Silva, Debora Hall, and Huan Liu, “Unsupervised Cyberbullying Detection via Time-Informed Gaussian Mixture Model”, in CIKM 2020

- [37] Ruocheng Guo, **Lu Cheng**, Jundong Li, Paul R. Hahn, and Huan Liu, “A Survey of Learning Causality with Data: Problems and Methods”, in ACM Computing Surveys 2020
- [38] **Lu Cheng**, Ruocheng Guo, Kasim Selçuk Candan, and Huan Liu, “Representation Learning for Imbalanced Cross-Domain Classification”, in SDM 2020
- [39] **Lu Cheng**, Jundong Li, Kasim Selçuk Candan, and Huan Liu, “Tracking Disaster Footprints with Social Stream Data”, in AAAI 2020
- [40] **Lu Cheng**, Ruocheng Guo*, Raha Moraffah*, Kasim Selçuk Candan, Adrienne Raglin, and Huan Liu, “A Practical Data Repository for Causal Learning with Big Data”, in Bench 2019
- [41] **Lu Cheng**, Jundong Li, Yasin N. Silva, Debora Hall, and Huan Liu, “PI-Bully: Personalized Cyberbullying Detection with Peer Influence”, in IJCAI 2019
- [42] **Lu Cheng**, Ruocheng Guo, and Huan Liu, “Robust Cyberbullying Detection with Causal Interpretation”, in WWW’ Companion 2019
- [43] **Lu Cheng**, Ruocheng Guo, Yasin N. Silva, Debora Hall, and Huan Liu, “Hierarchical Attention Networks for Cyberbullying Detection on the Instagram Social Network”, in SDM 2019
- [44] **Lu Cheng**, Jundong Li, Yasin N. Silva, Debora Hall, and Huan Liu, “XBully: Cyberbullying Detection within a Multi-Modal Context”, in WSDM 2019
- [45] **Lu Cheng**, Yasin N. Silva, Deborah Hall, and Huan Liu, “Personalized Learning for Cyberbullying Detection”, in SBP-BRiMS Doctoral Consortium 2018
- [46] **Lu Cheng**, Guangrui Liao, and Zhenyuan Liu, “A Multi-objective Immune Genetic Algorithm for Project Scheduling on Multi-skill Resources”, in AMM 2014

Teaching Experience

2024 Spring	Instructor, CS 594 <i>Socially Responsible Language Models</i>	UIC
2023 Fall	Instructor, CS 483 <i>Big Data Mining</i>	UIC
2023 Spring	Instructor, CS 483 <i>Big Data Mining</i>	UIC
2022 Fall	Instructor, CS 594 <i>Socially Responsible AI: Theories and Practice</i>	UIC
2022	Conference Tutor, <i>Socially Responsible AI for Data Mining: Theories and Practice</i>	SDM
2020-2021	Guest Lecturer, CSE 472 <i>Social Media Mining</i>	ASU
2021	Conference Tutor, <i>Socially Responsible AI: Issues, Purposes, and Challenges</i>	SBP-BRiMS
2018-2019	Teaching Assistant, CSE 472 <i>Social Media Mining</i>	ASU
2017	Teaching Assistant, PHYS 1200 <i>Physics II</i>	RPI
2015-2016	Teaching Assistant, ISYE 4210 <i>Design of Manufacturing Systems and Supply Chains</i>	RPI

Community Service

Volunteering

ICWSM	2022
Painting for a Cause, ASU Community Service	2021
International Conference on Artificial Intelligence and Statistics (AISTATS)	2021
Special Interest Group on Knowledge Discovery and Data Mining (KDD)	2020
Devils in Disguise, ASU Community Service	2019-2020
The Web Conference (WWW)	2019

Session Chair

ACM Conference on Fairness, Accountability, and Transparency (ACM FAccT)	2022
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Workshop Organizer

Web Conference AI-Driven Online Advertising: Market Design, Generative AI, and Ethics	2024
AAAI Responsible Language Models	2024

Conference Organizers

IEEE Big Data	2024
ACM International Conference on Web Search and Data Mining (WSDM)	2022

Panel Organizer

IEEE International Conference on Cognitive Machine Intelligence (CogMI)	2022
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Senior Program Committee

Association for the Advancement of Artificial Intelligence (AAAI, Main Track)	2022-2024
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Program Committee

International Conference on Machine Learning (ICML)	2024
Neural Information Processing Systems (NeurIPS)	2023
IEEE Big Data	2023
IEEE International Conference on Data Mining (ICDM)	2023
International Joint Conferences on Artificial Intelligence (IJCAI)	2023-24
ACM The Web Conference	2023-24
ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)	2022-24
ACL Rolling Review (ARR)	2022-2023
ACM International Conference on Web Search and Data Mining (WSDM)	2022
Association for the Advancement of Artificial Intelligence (AAAI, Special Track)	2021-2023
IEEE International Workshop on Data Quality for Intelligent Systems (DQIS)	2021
IEEE International Conference on Cognitive Machine Intelligence (IEEE CogMI)	2021, 2023
International workshop on Mining Actionable Insights from Social Networks at IJCAI	2021
International workshop on Cyber Social Threats at ICWSM	2021
Conference on Uncertainty in Artificial Intelligence (UAI)	2021-2023
Empirical Methods in Natural Language Processing (EMNLP)	2021-22
Conference series on Advances in Social Network Analysis and Mining (ASONAM)	2021
ACM Multimedia (ACM MM)	2021-2022
IEEE International Conference on Smart Data Services (SMDS)	2021
International Conference on Cyber-Technologies and Cyber-Systems (CYBER)	2021
International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRIMS)	2019-2021

Conference Subreviewer

IEEE Big Data	2021
The Web Conference (WWW)	2021
Annual Meeting of the Association for Computational Linguistics (ACL)	2021
International Conference on Machine Learning (ICML)	2021
ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)	2018-2021
IEEE International Conference on Data Mining (ICDM)	2020
Special Interest Group on Information Retrieval (SIGIR)	2018-2020
European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD)	2020
The Conference on Information and Knowledge Management (CIKM)	2019
Workshop on Reducing Online Misinformation Exposure (ROME)	2019
Conference series on Advances in Social Network Analysis and Mining (ASONAM)	2018-2019

Journal Reviewer

Pattern Recognition	2023
Data Mining and Knowledge Discovery	2022
Frontiers in Big Data	2022
PLOS ONE	2022
IEEE Access	2021-2022
IEEE Transactions on Knowledge and Data Engineering (TKDE)	2018-2021
Computers & Security (COSE)	2020, 2022
IEEE Transactions on Computational Social Systems (TCSS)	2020
IEEE Transactions on Artificial Intelligence (TAI)	2020
ACM Computing Survey (CSUR)	2019, 2023
Social Network Analysis and Mining (SNAM)	2019
ACM Transactions on Knowledge Discovery from Data (TKDD)	2019

Grants

- Collaborative Research: III: MEDIUM: Knowledge discovery from highly heterogeneous, sparse and private data, Co-PI, NSF 2023-2027
- Dual-Privacy Preserving Graph Neural Networks under Data Bias, Sole PI, Cisco 2023-24

Patent

SYSTEMS AND METHODS FOR UNSUPERVISED CYBERBULLYING DETECTION VIA TIME-INFORMED GAUSSIAN MIXTURE MODEL. Cheng et al. US Patent.	2024
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Honors & Awards

2024	AAAI New Faculty Highlight	AAAI
2023	Runner-up of INNS Doctoral Dissertation Award	INNS
2022	Cisco Faculty Research Award	Cisco
2022	CS Outstanding PhD Student	ASU
2022	Doctoral Forum Best Poster	SDM
2022	ICWSM Student Travel Award	Atlanta
2022	CIDSE Doctoral Fellowship	ASU
2022	WSDM Student Travel Award	Online
2021	Dean's Dissertation Award (6 out of 27,000)	ASU
2021	CIDSE Doctoral Fellowship	ASU
2021	The Web Conference Student Travel Award	Online
2021	WSDM Student Travel Award	Online
2020	ASU Graduate Outstanding Research Award	ASU
2020	KDD2020 Student Travel Award	Online
2020	IBM PhD Social Good Fellow	Yorktown Heights
2020	Visa Research Scholarship for AAAI20	New York
2020	AAAI20 Student Travel Award	New York
2019	The Web Conference Student Travel Award	San Francisco
2019	ASU's GPSA Individual Travel Funding	ASU
2019	SIAM-SDM Student Travel Award	Canada
2019	WSDM Student Travel Support	Australia
2018	Finalist of the Governor's Celebration of Innovation Award (Academic category)	Phoenix
2018	ASU Grace Hopper Celebration Scholarship	ASU
2012, 2014	Triple-A Student	HUST, China
2012, 2014	National Scholarship	HUST, China
2012-2013	Scholarship for Outstanding Learning Achievement	HUST, China
2012	Outstanding Undergraduates	HUST, China