

# Lu Cheng

*Socially Responsible AI & Data Mining & Causal Learning*

☎ (+1) 518-833-2246 | ✉ lcheng35@asu.edu | 🏠 <http://www.public.asu.edu/~lcheng35/>

## Education

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### Arizona State University

PH.D. IN COMPUTER SCIENCE AND ENGINEERING

*Tempe, USA*

*Aug. 2017 - Present*

### Rensselaer Polytechnic Institute

M.ENG. IN INDUSTRIAL ENGINEERING

*Troy, USA*

*Aug. 2015 - May 2017*

### Huazhong University of Science and Technology

B.ENG. IN LOGISTICS & SYSTEMS ENGINEERING

*Wuhan, China*

*Sep. 2011 - June 2015*

## Research Experience

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### Data Mining and Machine Learning Lab, ASU

ADVISOR: HUAN LIU

*PhD Student*

*Aug. 2017 - Present*

### IBM Research

MANAGER: KUSH R. VARSHNEY

*Research Intern*

*June 2020 - Aug. 2020*

### Microsoft Research

MENTOR: GAVIN SMYTH

*Research Intern*

*June 2017 - Aug. 2017*

### Computer Science Department, RPI

WORKED ON JOINT TRIGGER AND ARGUMENT EXTRACTION

*Master Student*

*Sep. 2016 - Dec. 2016*

### Industrial and Systems Engineering Department, RPI

WORKED ON COMPUTER-BASED SIMULATION FOR DISASTER RESPONSE

*Master Student*

*Sep. 2015 - Sep. 2016*

### School of Automation, HUST

WORKED ON RESOURCE CONSTRAINED PROJECT SCHEDULING

*Undergraduate*

*Sep. 2012 - June 2015*

## Tutorials & Invited Talks

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- [1] **Lu Cheng**, “Causal Understanding of Fake News Dissemination On Social Media”, Tsinghua AI TIMES 2021
- [2] **Lu Cheng**, “Combating Cyberbullying and Disinformation on Social Media: The Roles of Socially Responsible AI”, IJCAI Workshop MAISoN 2021
- [3] **Lu Cheng**, “Socially Responsible AI Algorithms: Issues, Purposes, and Challenges”, University of North Texas 2021
- [4] **Lu Cheng**, Fred Morstatter, Huan Liu, “Socially Responsible AI Algorithms: Issues, Purposes, and Challenges”, SBP-BRiMS 2021

## Publications

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### Conference and Journal Publications

- [1] **Lu Cheng**, Ruocheng Guo, and Huan Liu, “Estimating Causal Effects of Multi-Aspect Online Reviews with Multi-Modal Proxies”, in WSDM’22
- [2] **Lu Cheng**, Ruocheng Guo, and Huan Liu, “Causal Mediation Analysis with Hidden Confounders”, in WSDM’22
- [3] **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
- [4] 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
- [5] 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
- [6] 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

- [7] **Lu Cheng**, Kush R. Varshney, and Huan Liu, “Socially Responsible AI Algorithms: Issues, Purposes, and Challenges”, in *Journal of Artificial Intelligence Research* 2021
- [8] **Lu Cheng**, Ruocheng Guo, Kai Shu, and Huan Liu, “Causal Understanding of Fake News Dissemination on Social Media”, in *KDD* 2021
- [9] **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
- [10] **Lu Cheng**, Ahmadreza Mosallanezhad\*, Paras Sheth\*, and Huan Liu, “Causal Learning for Socially Responsible AI”, in *IJCAI (survey track)* 2021
- [11] Suyu Ge, **Lu Cheng**, and Huan Liu, “Improving Cyberbullying Detection with User Interaction”, in the *Web Conference* 2021
- [12] **Lu Cheng**, Ruocheng Guo, and Huan Liu, “Long Term Effect Estimation with Surrogate Representation”, in *WSDM* 2021
- [13] **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
- [14] **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
- [15] **Lu Cheng**, Yasin N. Silva, Deborah Hall, and Huan Liu, “Session-based Cyberbullying Detection: Problems and Challenges”, in *IEEE Internet Computing Special Issue* 2020
- [16] **Lu Cheng**, Kai Shu, Siqi Wu, Yasin N. Silva, Deborah Hall, and Huan Liu, “Unsupervised Cyberbullying Detection via Time-Informed Gaussian Mixture Model”, in *CIKM* 2020
- [17] 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
- [18] **Lu Cheng**, Ruocheng Guo, Kasim Selçuk Candan, and Huan Liu, “Representation Learning for Imbalanced Cross-Domain Classification”, in *SDM* 2020
- [19] **Lu Cheng**, Jundong Li, Kasim Selçuk Candan, and Huan Liu, “Tracking Disaster Footprints with Social Stream Data”, in *AAAI* 2020
- [20] **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
- [21] **Lu Cheng**, Jundong Li, Yasin N. Silva, Deborah Hall, and Huan Liu, “PI-Bully: Personalized Cyberbullying Detection with Peer Influence”, in *IJCAI* 2019
- [22] **Lu Cheng**, Ruocheng Guo, and Huan Liu, “Robust Cyberbullying Detection with Causal Interpretation”, in *WWW’ Companion* 2019
- [23] **Lu Cheng**, Ruocheng Guo, Yasin N. Silva, Deborah Hall, and Huan Liu, “Hierarchical Attention Networks for Cyberbullying Detection on the Instagram Social Network”, in *SDM* 2019
- [24] **Lu Cheng**, Jundong Li, Yasin N. Silva, Deborah Hall, and Huan Liu, “XBully: Cyberbullying Detection within a Multi-Modal Context”, in *WSDM* 2019
- [25] **Lu Cheng**, Yasin N. Silva, Deborah Hall, and Huan Liu, “Personalized Learning for Cyberbullying Detection”, in *SBP-BRiMS Doctoral Consortium* 2018
- [26] **Lu Cheng**, Guangrui Liao, and Zhenyuan Liu, “A Multi-objective Immune Genetic Algorithm for Project Scheduling on Multi-skill Resources”, in *AMM* 2014

### Preprints and Submissions

- [27] **Lu Cheng**, Ahmadreza Mosallanezhad, Yasin Silva, Deborah Hall, and Huan Liu, “Joint Bias Mitigation for Context-Aware Toxicity Detection”, submitted to *AAAI* 2022
- [28] **Lu Cheng\***, Suyu Ge\*, Yongfeng Huang, and Huan Liu, “Joint Mitigation of Interactional Bias”, submitted to *AAAI* 2022
- [29] Paras Sheth, Ruocheng Guo, **Lu Cheng**, Huan Liu, and K. Selçuk Candan, “Causal Disentanglement for Implicit Recommendations with Network Information”, submitted to *AAAI’22*
- [30] Paras Sheth, Ruocheng Guo, **Lu Cheng**, Huan Liu, and K. Selçuk Candan, “Causal Disentanglement with Network Information for De-biased Recommendations”, submitted to *SDM’22*
- [31] Hui Hu, **Lu Cheng**, Mike Borowczak, “Learning Privacy-Preserving Graph Convolutional Network with Partially Observed Sensitive Attributes”, submitted to *WSDM’22*
- [32] Faisal Alatawi, **Lu Cheng**, Anique Tahir, Mansooreh Karami, Bohan Jiang, Tyler Black, and Huan Liu. “A Survey on Echo Chambers on Social Media: Description, Detection and Mitigation”, submitted to *ACM Transaction on Social Computing*

- [33] 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”, submitted to IEEE Transactions on Mobile Computing
- [34] **Lu Cheng**, Ruocheng Guo, Raha Moraffah, Paras Sheth, Kasim Selçuk Candan, and Huan Liu, “Evaluation Methods and Measures for Causal Learning Algorithms”, submitted to IEEE Transactions on Artificial Intelligence

### Peer-reviewed Posters (with poster papers or abstracts)

- [35] B. Wheeler, **L. Cheng**, D. Hall, and Y. N. Silva, “BullyBlocker: Integrating Data, Computer, and Psychological Science to Identify Cyberbullying on Social Media”. The 2020 Women in Statistics and Data Science Conference (WSDS), 2020.
- [36] W. Yang, **L. Cheng**, K. Schodt, C. Shao, D. Hall, Y. Silva. “An interdisciplinary investigation of temporal aspects of cyberbullying on Instagram”. The Annual Meeting of the Society for Personality & Social Psychology (SPSP), Portland, OR, USA, 2019.
- [37] L. Jiang, A. Trow, V. Delgadillo, C. Sanchez, **L. Cheng**, Y. Silva, D. Hall. “An Interdisciplinary Investigation of Temporal Aspects of Cyberbullying”. The Western Psychological Association (WPA) Convention, Portland, OR, USA, 2018.
- [38] A. Trow, L. Jiang, **L. Cheng**, C. Sanchez, V. Delgadillo, D. Hall, Y. Silva. “BullyBlocker: Detecting Cyberbullying Victimization Risk through an Interdisciplinary Identification Model”. The Western Psychological Association (WPA) Convention, Portland, OR, USA, 2018.

## Proposal Writing

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### Addressing Bias in Detecting and Countering Cyberbullying on Instagram

PI: DR. YASIN SILVA

- Designed and wrote one of the two tasks “Mitigating Bias in Cyberbullying Detection”
- Submitted to Instagram in 2021

### SaTC: CORE: Small: Interdisciplinary Models to Identify and Understand Cyberbullying

PI: DR. YASIN SILVA

- Designed and wrote one of the four research plans “Automated Models for Online Misbehavior Identification”
- Submitted to National Science Foundation in 2020

### Benchmarking Causal Learning for Efficacy, Reproducibility and Collaboration in AI Research

PI: DR. HUAN LIU

- Designed and wrote the section “A Success Story: Standardization of ML Evaluation”
- Submitted to National Institute of Standards and Technology in 2020

### Knowing the Unknown: Exploring the Space of Adversarial Attacks via Causal Learning

PI: DR. HUAN LIU

- Designed and wrote two of the four tasks “Coverage of Causal Learning and Transferability of Adversarial Examples” and “Theoretical Analysis and Empirical Studies”
- Submitted to AMC in 2019

## Teaching Experience

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2020-2021	Guest Lecturer, <i>CSE 472 Social Media Mining</i>	ASU
2021	Conference Tutor, <i>Socially Responsible AI: Issues, Purposes, and Challenges</i>	SBP-BRIMS
2018-2019	Teaching Assistant, <i>CSE 472 Social Media Mining</i>	ASU
2017	Teaching Assistant, <i>PHYS 1200 Physics II</i>	RPI
2015-2016	Teaching Assistant, <i>ISYE 4210 Design of Manufacturing Systems and Supply Chains</i>	RPI

## Mentoring

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## **Data Mining and Machine Learning Lab, ASU**

ANIQUE TAHIR, PHD STUDENT

*Aug. 2021 - Present*

- Working on Out-of-Distribution problems in social media

## **Data Mining and Machine Learning Lab, ASU**

NAYOUNG KIM, PHD STUDENT

*June 2021 - Present*

- Working on debiasing word embeddings with intersectional subspace

## **Department of Computer Science, University of Wyoming**

HUI HU, PHD STUDENT

*Nov. 2020 - Present*

- Co-authored “Learning Privacy-Preserving Graph Convolutional Network with Partially Observed Sensitive Attributes”, submitted to WSDM’22

## **Data Mining and Machine Learning Lab, ASU**

AHMADREZA MOSALLANEZHAD, PHD STUDENT

*Oct. 2020 - Present*

- Co-authored 3 papers related to socially responsible AI, two accepted to ACL’21 and IJCAI’21, one submitted to AAAI’22

## **Data Mining and Machine Learning Lab, ASU**

PARAS SHETH: PHD STUDENT

*Oct. 2020 - Present*

- Co-authored four papers on causal learning, one accepted to IJCAI’21, three submitted to IEEE Transactions on Artificial Intelligence, SDM’22, and AAAI’22

## **Data Mining and Machine Learning Lab, ASU**

FAISAL ALATAWI: PHD STUDENT

*Sep. 2020 - Present*

- Co-authored “A Survey on Echo Chambers on Social Media: Description, Detection and Mitigation”, submitted to ACM Transactions on Social Computing

## **School of Computer Science, Northwestern Polytechnical University**

QIANRU WANG: VISITING PHD STUDENT

*Aug. 2020 - May 2021*

- Co-authored two journal papers, one submitted to IEEE Transactions on Mobile Computing, one accepted to IEEE Internet of Things Journal

## **Department of Electronic Engineering, Tsinghua University**

SUYU GE, VISITING UNDERGRADUATE STUDENT

*June 2020 - Present*

- Co-authored two papers, one accepted to WWW’21, one submitted to AAAI’22

## **Community Service**

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### **Web Chair**

ACM International Conference on Web Search and Data Mining (WSDM)

*2022*

### **Senior Program Committee**

Association for the Advancement of Artificial Intelligence (AAAI, Main Track)

*2022*

### **Program Committee Member**

ACL Rolling Review (ARR)

*2022*

ACM International Conference on Web Search and Data Mining (WSDM)

*2022*

Association for the Advancement of Artificial Intelligence (AAAI, Special Track)

*2021-2022*

IEEE International Workshop on Data Quality for Intelligent Systems (DQIS)

*2021*

IEEE International Conference on Cognitive Machine Intelligence (IEEE CogMI)

*2021*

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*

Empirical Methods in Natural Language Processing (EMNLP)

*2021*

Conference series on Advances in Social Network Analysis and Mining (ASONAM)

*2021*

ACM Multimedia (ACM MM)

*2021*

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
Special Interest Group 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

ACM Computing Survey (CSUR)	2019
IEEE Transactions on Knowledge and Data Engineering (TKDE)	2018-2021
Computers & Security (COSE)	2020
IEEE Transactions on Computational Social Systems (TCSS)	2020
IEEE Transactions on Artificial Intelligence (TAI)	2020
Social Network Analysis and Mining (SNAM)	2019
ACM Transactions on Knowledge Discovery from Data (TKDD)	2019

### Volunteering

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

### Honors & Awards

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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
2013-2014	Outstanding Volunteer	HUST, China
2012, 2014	Triple-A Student	HUST, China
2012, 2014	National Scholarship	HUST, China
2014	Honorable Mention in COMAP's Mathematical Contest in Modeling	USA
2013	The 3rd Place in the First Lanesync Supply Chain Design Competition	HUST, China
2013	The 3rd Place in "Fei Hang" Mathematical Contest in Modeling	HUST, China
2013	Inovance Technology Scholarship	HUST, China
2012-2013	Scholarship for Outstanding Learning Achievement	HUST, China
2012	Outstanding Undergraduates	HUST, China

### Letter of References

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**Dr. Huan Liu, Fellow of ACM, AAAI, AAAS, IEEE, ASEE, and SIAM**

- Professor, Computer Science and Engineering, Arizona State University
- Phone: +1 480-727-7349
- Email: huanliu@asu.edu
- Homepage: <http://www.public.asu.edu/~huanliu/>

**Dr. Kush R. Varshney, Senior member of the IEEE, Member of the Partnership on AI's Safety-Critical AI expert group**

- Distinguished Research Staff Member and Manager, IBM Thomas J. Watson Research Center
- Phone: +1 914-945-1628
- Email: krvarshn@us.ibm.com
- Homepage: <http://krvarshney.github.io/>

**Dr. Yasin Silva**

- Associate Professor, Mathematical and Natural Sciences, Arizona State University
- Phone: +1 602-543-2818
- Email: ysilva@asu.edu
- Homepage: <http://www.public.asu.edu/~ynsilva>