

Chirag Agarwal

CONTACT INFORMATION

Email: chiragagarwall12@gmail.com

Webpage: <https://chirag126.github.io/>

ACADEMIC & PROFESSIONAL EXPERIENCE

Harvard University

Postdoctoral Research Fellow

Advisor: [Dr. Marinka Zitnik](#) and [Dr. Hima Lakkaraju](#)

Boston, MA

2020 – Current

Adobe

Research Scientist

Noida, IN

2022 – Current

Auburn University

Research Assistant

Advisor: [Dr. Anh Nguyen](#)

Auburn, AL

Summer 2019

Robert Bosch LLC

Computer Vision/Augmented Reality Intern

Sunnyvale, CA

Summer 2018

Tempus labs Inc.

Imaging Science Intern

Chicago, IL

Spring 2018

Kitware Inc.

Research and Development Intern

Clifton Park, NY

Summer 2017

Geisinger Health Systems

Research Intern

Danville, PA

Summer 2016

EDUCATION

University of Illinois at Chicago

Ph.D. in Electrical and Computer Engineering

Chicago, IL

2020

- Committee: [Dr. Dan Schonfeld](#), [Dr. Bharati Prasad](#), [Dr. Mojtaba Soltanalian](#),
[Dr. Piotr Gmytrasiewicz](#), [Dr. Anh Nguyen](#)

- Thesis: “Robustness and Explainability of Deep Neural Networks”

University of Illinois at Chicago

M.S. in Electrical and Computer Engineering

Chicago, IL

2018

- Project: Fall detection in elderly patients

SELECTED HONORS & ACHIEVEMENTS

[AINet Fellow](#) by DAAD

2021

AI for Social Good Google Workshop with [Dr. Marinka Zitnik](#) and [Dr. Hima Lakkaraju](#) (US \$10,000)

2021

[Spotlight presentation](#), ICML workshop on Human Interpretability in Machine Learning

2020

Research Proposal accepted by Google Cloud Platform (US \$1,000)

2020

Research Proposal accepted by Google Cloud Platform (US \$1,000)

2020

RESEARCH ARTICLES

Articles in Peer-Reviewed Journals

44. **C. Agarwal**, O. Queen, H. Lakkaraju, M. Zitnik: Evaluating Explainability for Graph Neural Networks, *Nature Scientific Data*, 2023.
43. H. Honarvar, **C. Agarwal**, S. Somani, A. Vaid, J. Lampert, T. Wanyan, V. Y. Reddy, G. N. Nadkarni, R. Miotto1, M. Zitnik, F. Wang, B. S. Glicksberg: Enhancing convolutional neural network predictions of electrocardiograms with left ventricular dysfunction using a novel sub-waveform representation, *Cardiovascular Digital Health Journal*, 2022.
42. **C. Agarwal**, S. Gupta, M. Y. Najjar, T. E. Weaver, X. J. Zhou, D. Schonfeld, B. Prasad: Deep Learning Analyses of Brain MRI to Identify Sleepiness in Treated Obstructive Sleep Apnea: A Pilot Study, *Journal of Sleep and Vigilance (JSV)*, 2022.
41. B. Prasad*, **C. Agarwal***, E. Schonfeld, D. Schonfeld, B. Mokhlesi: Deep learning applied to polysomnography to predict blood pressure in obstructive sleep apnea and obesity hypoventilation: A proof-of-concept study, *Journal of Clinical Sleep Medicine (JCSM)*, 2020.
40. **C. Agarwal**, J. Klobusicky, D. Schonfeld: Convergence of backpropagation with momentum for network architectures with skip connections, *Journal of Computational Mathematics (JCM)*, 2019.
39. E. Cha, Y. Veturi, **C. Agarwal**, M. Arbabshirani, S. Pendergrass: Using Adipose Measures from Electronic Health Record Imaging Based Data for Discovery, *Journal of Obesity*, 2018.

Articles in Peer-Reviewed Conference Proceedings

38. S. Deshmukh, A. Dasgupta, N. Jiang, B. Krishnamurthy, **C. Agarwal**, J. Subramanian, G. Theocharous: Trajectory-based Explainability Framework for Offline RL, *International Conference on Learning Representations (ICLR)*, 2023.
37. J. Cheng, G. Dasoulas, H. He, **C. Agarwal**, M. Zitnik: GNNDelete: A General Unlearning Strategy for Graph Neural Networks, *International Conference on Learning Representations (ICLR)*, 2023.
36. V. Giunchiglia, C. V. Shukla, G. Gonzalez, **C. Agarwal**: Towards Training GNNs using Explanation Directed Message Passing, *Proceedings of the First Learning on Graphs Conference (LoG)*, 2022.
35. **C. Agarwal**, E. Saxena, S. Krishna, M. Pawelczyk, N. Johnson, I. Puri, M. Zitnik, H. Lakkaraju : OpenXAI: Towards a Transparent Evaluation of Model Explanations, *Conference on Neural Information Processing Systems (NeurIPS)*, 2022.
34. **C. Agarwal**, D. D'Souza, S. Hooker: Estimating Example Difficulty using Variance of Gradients, *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022.
33. **C. Agarwal**, M. Zitnik, H. Lakkaraju: Probing GNN Explainers: A Rigorous Theoretical and Empirical Analysis of GNN Explanation Methods, *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2022.
32. M. Pawelczyk, **C. Agarwal**, S. Joshi, S. Upadhyay, H. Lakkaraju: Exploring Counterfactual Explanations Through the Lens of Adversarial Examples: A Theoretical and Empirical Analysis, *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2022.
31. **C. Agarwal**, H. Lakkaraju, M. Zitnik: Towards a Unified Framework for Fair and Stable Graph Representation Learning, *Conference on Uncertainty in Artificial Intelligence (UAI)*, 2021.
30. S. Agarwal, S. Jabbari, **C. Agarwal**, S. Upadhyay, Z. S. Wu, H. Lakkaraju: Towards the Unification and Robustness of Perturbation and Gradient Based Explanations, *International Conference on Machine Learning (ICML)*, 2021.

29. **C. Agarwal***, S. Khobahi*, D. Schonfeld, M. Soltanian: CoroNet: A Deep Network Architecture for Semi-Supervised Task-Based Identification of COVID-19 from Chest X-ray Images, *SPIE Medical Imaging*, 2021.
28. **C. Agarwal**, A. Nguyen: Explaining image classifiers by removing input features using generative models, *Asian Conference on Computer Vision (ACCV)*, 2020.
27. N. Bansal*, **C. Agarwal***, A. Nguyen*: SAM: The Sensitivity of Interpretability Methods to Hyperparameters, *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020.
Oral presentation (Top 5%).
26. **C. Agarwal**, S. Khobahi, A. Bose, M. Soltanian, D. Schonfeld: Deep-URL: A Model-Aware Approach To Blind Deconvolution Based On Deep Unfolded Richardson-Lucy Network, *IEEE Conference on Image Processing (ICIP)*, 2020.
25. **C. Agarwal**, A. Nguyen, D. Schonfeld: Improving Robustness to Adversarial Examples by Encouraging Discriminative Features, *IEEE Conference on Image Processing (ICIP)*, 2019.
Spotlight presentation (Top 10%).
24. M. Aloraini, M. Sharifzadeh, **C. Agarwal**, D. Schonfeld: Statistical Sequential Analysis for Object-based Video Forgery Detection, *Electronic Imaging*, 2019.
23. N. Khobragade*, **C. Agarwal***: Multi-class segmentation of neuronal electron microscopy images using deep learning, *SPIE Medical Imaging*, 2018.
22. **C. Agarwal**, M. Sharifzadeh, D. Schonfeld: CrossEncoders: A complex neural network compression framework, *IS&T International Symposium on Electronic Imaging*, 2018.
21. M. Sharifzadeh, **C. Agarwal**, M. Aloraini, D. Schonfeld: Convolutional neural network steganalysis's application to steganography, *IEEE Visual Communications and Image Processing (VCIP)*, 2017.
20. **C. Agarwal**, A.H. Dallal, M.R. Arbabshirani, A. Patel, G. Moore: Unsupervised quantification of abdominal fat from CT images using Greedy Snakes, *SPIE Medical Imaging*, 2017.
19. A.H. Dallal, **C. Agarwal**, M.R. Arbabshirani, A. Patel, G. Moore: Automatic estimation of heart boundaries and cardiothoracic ratio from chest X-ray images, *SPIE Medical Imaging*, 2017.
18. M.R. Arbabshirani, A.H. Dallal, **C. Agarwal**, A. Patel, G. Moore: Accurate segmentation of lung fields on chest radiographs using deep convolutional networks, *SPIE Medical Imaging*, 2017.
17. **C. Agarwal**, A. Bose, S. Maiti, N. Islam, S.K. Sarkar: Enhanced data hiding method using DWT based on Saliency model, *IEEE International Conference on Signal Processing, Computing and Control (ISPCC)*, 2013.
16. S. Maiti, **C. Agarwal**, A. Bose, S.K. Sarkar: Robust data hiding technique in wavelet domain using saliency map, *International Journal of Advances in Engineering and Technology*, 2013.
15. N. Islam S. Maiti, A. Bose, **C. Agarwal**, S. K. Sarkar: An Improved Method of Pre-Filter Based Image Watermarking in DWT Domain, *International Journal of Computer Science and Technology*, 2013.

Preprints and Workshop Articles

14. S. Krishna, **C. Agarwal**, H. Lakkaraju: On the Impact of Adversarially Robust Models on Algorithmic Recourse, *Preliminary version presented at Trustworthy and Socially Responsible Machine Learning Workshop, NeurIPS 2022*.
13. S. Deshmukh, A. Dasgupta, **C. Agarwal**, N. Jiang, B. Krishnamurthy, G. Theocharous, J. Subramanian: Trajectory-based Explainability Framework for Offline RL, *Preliminary version presented at Offline RL Workshop, NeurIPS 2022*.
12. **C. Agarwal**, O. Queen, M. Zitnik: An Explainable AI Library for Benchmarking Graph Explainers, *Preliminary version presented at Graph Learning Benchmarks Workshop, WWW, 2022*.

11. **C. Agarwal**, N. Johnson, M. Pawelczyk, S. Krishna, E. Saxena, M. Zitnik, H. Lakkaraju: Rethinking Stability for Attribution-based Explanations, *Preliminary version presented at PAIR² Struct Workshop, ICLR, 2022.*
Oral Presentation.
10. **C. Agarwal**, M. Zitnik, H. Lakkaraju: Towards a Unified Framework for Fair and Stable Graph Representation Learning, *Preliminary version presented at Socially Responsible Machine Learning Workshop, ICML, 2021.*
9. **C. Agarwal**, H. Lakkaraju, M. Zitnik: Towards a Rigorous Theoretical Analysis and Evaluation of GNN Explanations, *Preliminary version presented at Theoretic Foundation, Criticism, and Application Trend of Explainable AI Workshop, ICML, 2021.*
8. M. Pawelczyk, S. Joshi, **C. Agarwal**, S. Upadhyay, H. Lakkaraju: On the Connections between Counterfactual Explanations and Adversarial Examples, *Preliminary version presented at Theoretic Foundation, Criticism, and Application Trend of Explainable AI Workshop, ICML, 2021.*
7. D. D'Souza, Z. Nussbaum, **C. Agarwal**, S. Hooker: A Tale Of Two Long Tails, *Preliminary version presented at Uncertainty & Robustness in Deep Learning Workshop, ICML, 2021.*
6. H. Honarvar, **C. Agarwal**, S. Somani, A. Vaid, J. Lampert, T. Wanyan, V. Y. Reddy, G. N. Nadkarni, R. Miotto1, M. Zitnik, F. Wang, B. S. Glicksberg: A novel representation of electrocardiogram waveforms for enhancing deep learning predictions, *Preliminary version presented at Interpretable Machine Learning in Healthcare Workshop, ICML, 2021.*
5. **C. Agarwal***, S. Hooker*: Estimating Example Difficulty using Variance of Gradients, *Preliminary version presented at Human Interpretability in Machine Learning Workshop, ICML, 2020.*
4. **C. Agarwal***, P. Chen*, A. Nguyen: Intriguing generalization and simplicity of adversarially trained neural networks, *Preliminary version presented at Human Interpretability in Machine Learning Workshop, ICML, 2020.*
Spotlight Presentation.
3. **C. Agarwal**, B. Dong, D. Schonfeld, A. Hoogs: An explainable adversarial robustness metric for deep learning neural networks, 2018.
2. M. Sharifzadeh, **C. Agarwal**, M. Salarian, D. Schonfeld: A new parallel message-distribution technique for cost-based steganography, 2017.

Patents

1. T. Menta, A. Patil, S. Jandial, Balaji K, **C. Agarwal**, M. Sarkar: HASTE: A Novel Method and Apparatus to Estimate Transferability using Hard Subsets. Internal Reference: P11683-US.

TEACHING EXPERIENCE

Joint Instructor at Harvard University	Spring 2021
<i>Course on Interpretability and Explainability in Machine Learning</i>	
Teaching Assistant for	
University of Illinois at Chicago	Spring, Fall 2014 - 2020
<i>Pattern Recognition, Image Analysis & Computer Vision, Digital Signal Processing, Neural Networks.</i>	

TUTORIALS

Explainable ML in the Wild: When Not to Trust Your Explanations	FAccT 2021
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INVITED TALKS

TrustML Young Scientists Seminars at RIKEN-AIP, Japan	2022
Adobe Research: XAI: Challenges and Solutions	2022
CAI Summer School at IIIT-Delhi	2022
LOGML Summer School	2022
Guest Lecture in Interpretability & Explainability course at Harvard	2021
2d3d.ai	2021
W&B - Weights & Biases Salon	2020

COMMUNITY SERVICE

Open Collaboration Initiatives: TrustworthyML Initiative and MLCollective	2021-Present
Program Committee for Workshops:	
SRML - Workshop on Socially Responsible Machine Learning	ICLR, 2022
AdvML - New Frontiers in Adversarial Machine Learning	ICML, 2022
SRML - Workshop on Socially Responsible Machine Learning	ICML, 2021
SeSML - Workshop on Security and Safety in Machine Learning Systems	ICLR, 2021
AROW - Workshop on Adversarial Robustness in the Real World	ECCV, 2020-2021
WHI - Workshop on Human Interpretability in Machine Learning	ICML, 2020
Program Committee for Conferences:	
AISTATS - International Conference on Artificial Intelligence and Statistics	2023
AAAI - AAAI International Conference on Artificial Intelligence	2023
LOG - Learning on Graphs Conference	2022
FAccT - ACM Conference on Fairness, Accountability, and Transparency	2022-2023
ICLR - International Conference on Learning Representations	2022-2023
NeurIPS - Advances in Neural Information Processing Systems	2021-2022
KDD - ACM SIGKDD Conference on Knowledge Discovery and Data Mining	2021-2023
ICML - International Conference on Machine Learning	2021-2023
WACV - IEEE/CVF Winter Conference on Applications of Computer Vision	2023
CVPR - IEEE/CVF Conference on Computer Vision and Pattern Recognition	2023
Journal Reviewing:	
TMLR - The Transactions on Machine Learning Research	2022
TMI - IEEE Transactions on Medical Imaging	2022