

Amrith Setlur

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Research Overview

My research broadly focuses on using theoretical foundations of machine learning for responsible computing, specifically in the context of large pretrained models learned from human preferences. This involves understanding efficient learning algorithms that guarantee robustness to distribution shifts, uncertainty quantification, algorithmic fairness and privacy preservation.

Education

Carnegie Mellon University

PhD in Machine Learning

CGPA: 4.05/4.0 ADVISORS: [PROF. VIRGINIA SMITH](#) AND [PROF. SERGEY LEVINE](#)

Pittsburgh, PA

Jan 2022 - Present

Carnegie Mellon University

M.S. in Language Technologies

CGPA: 4.12/4.0 ADVISORS: [PROF. BARNABÁS PÓCZOS](#) AND [PROF. ALAN W BLACK](#)

Pittsburgh, PA

Aug 2019 - May 2021

National Institute of Technology (President's Gold Medal)

B.S. (Honors) in Computer Science and Engineering

CGPA: 9.91/10.0; Institute Rank: 1

Trichy, India

Aug 2013 - May 2017

Selected Publications¹

Deep Neural Networks Tend To Extrapolate Predictably

Katie Kang, [Amrith Setlur](#), Claire Tomlin, Sergey Levine; [ICLR 2024](#) [PDF]

Project and Probe: Sample-Efficient Domain Adaptation by Interpolating Orthogonal Features

Annie S. Chen*, Yoonho Lee*, [Amrith Setlur](#), Sergey Levine, Chelsea Finn; [ICLR 2024 \(Spotlight\)](#) [PDF]

Complementary Benefits of Contrastive Learning and Self-Training Under Distribution Shift

Saurabh Garg*, [Amrith Setlur](#)*, Zachary Lipton, Sivaraman Balakrishnan, Virginia Smith, Aditi Raghunathan; [NeurIPS 2023](#) [PDF]

Contextual Reliability: When Different Features Matter in Different Contexts

Gaurav Ghosal*, [Amrith Setlur](#)*, Daniel Brown, Anca Dragan, Aditi Raghunathan; [ICML 2023](#) [PDF]

Bitrate-Constrained DRO: Beyond Worst Case Robustness To Unknown Group Shifts

[Amrith Setlur](#), Don Dennis, Benjamin Eysenbach, Aditi Raghunathan, Chelsea Finn, Virginia Smith, Sergey Levine; [ICLR 2023](#) [PDF]

Leveraging Public Representations for Provably Private Transfer Learning

Pratiksha Thaker, [Amrith Setlur](#), Virginia Smith, Zhiwei Steven Wu; [TPDP 2023](#) [PDF]

Adversarial Unlearning: Reducing Confidence Along Adversarial Directions

[Amrith Setlur](#), Benjamin Eysenbach, Virginia Smith, Sergey Levine; [NeurIPS 2022](#) [PDF]

Two Sides of Meta-Learning Evaluation: In vs. Out of Distribution

[Amrith Setlur](#)*, Oscar Li*, Virginia Smith; [NeurIPS 2021](#) [PDF]

Explaining The Efficacy of Counterfactually Augmented Data

Divyansh Kaushik, [Amrith Setlur](#), Eduard Hovy, Zachary C. Lipton; [ICLR 2021](#) [PDF]

Nonlinear Independent Subspace Analysis with Auxiliary Variables for Learning Speech Representations

[Amrith Setlur](#), Barnabas Poczos, Alan W Black; [Interspeech 2020 \(Best Student Paper Finalist\)](#) [PDF]

Industry Experience

Apple Inc. (Hosted by [Kunal Talwar](#) & [Vitaly Feldman](#))

RESEARCH SCIENTIST INTERN

Cupertino, USA

May 2023 - Aug 2023

Worked on the problem of private and personalized histogram estimation in a federated setting. The main goal was to delineate the benefits of collaboration beyond learning a global model that is finetuned/personalized for each user. We use techniques from Good-Turing estimation and clustering to learn personalized histograms in a provably private way that also yields practical gains on real world data.

¹The * mark denotes equal contribution. Please see [this page](#) for the complete list.

Amazon Research

MACHINE LEARNING ENGINEER

Bengaluru, IND

Aug 2017 - May 2019

As part of the Ad Placement Optimization team, worked on prediction problems like advertiser claim detection and in the online setting on contextual product recommendations. Developed ML pipelines to match products for the "Frequently Bought Together" widget leading to a 0.4% improvement in click-through rate, for Sponsored Ads on Amazon.com.

Amazon Kindle

SOFTWARE ENGINEER INTERN

Chennai, IND

May 2016 - Aug 2016

Worked on the development of a distributed product/vendor attribute storage data structure that reduced latency (decreasing turn around time by ≈ 50 ms) to retrieve attributes for a billion e-books on Amazon Kindle.

Notable Accolades

- **Academic:** Recipient of three consecutive [Institute Medals](#) for the years 2014–15, 2015–16, 2016–17; President of India Gold Medal for securing the highest CGPA (9.91) across all departments; and the [RECAL Alumni Award](#) for "Best Academic Performance" and highest GPA in Computer Science Department.
- **Scholarships and awards:** Graduate Research Fellowship covering Tuition + Stipend from 2019-2021. Secured [All India Rank 196](#) at JEE Mains Examination (AIEEE) 2013 and as a result received the AIEEE Merit Scholarship from HRD Ministry, Government of India (INR 140,000). CEDI TATA Industrial Grant of INR 40,000 for *Most Innovative Undergraduate Thesis* on extractive text-summarization. Best poster award at the LTI Student Research Symposium 2019.
- **ACM ICPC:** Represented the college at the ACM ICPC Regionals 2014 (Team Leader) and 2015 (Coach). Secured 1st positions at the Delta Algorithon and the Algorithmic Coding Triathlon (Vortex) with 5000+ participants across the nation.
- **IASc Research Fellowship:** Proposed and implemented a polynomial time algorithm for K-median with outliers using two dimensional local search heuristics, specifically for large clusters ([report](#)). Advisor: [Prof. Naveen Garg](#), IIT Delhi.

Relevant Coursework

- **Graduate Courses:** 36709 Advanced Statistical Theory ([A](#)), 10716 Advanced Machine Learning Theory and Methods ([A+](#)), 10725 Convex Optimization ([A+](#)), 10708 Probabilistic Graphical Models ([A+](#)), 10701 Machine Learning (PhD) ([A+](#)), 11731 Machine Translation ([A+](#)), 11747 Neural Networks for NLP ([A+](#)), 11777 Multimodal Machine Learning ([A](#)).
- **Undergraduate Courses:** MA101 Advanced Calculus ([A+](#)), MA102 Graduate Linear Algebra ([A+](#)), MA204 Probability Theory ([A+](#)), CS064 Artificial Intelligence & Expert Systems ([A+](#)), CS065 Natural Language Processing ([A+](#)), CS201 Data Structures & Algorithms ([A+](#)), CS212 Combinatorics & Graph Theory ([A+](#)), CS203 Discrete Structures ([A+](#)), MA304 Operations Research ([A+](#)).

Teaching Experience

- TA for 10725 Convex Optimization (Spring '23)
- TA for 10719 Federated and Collaborative Learning (Fall '23)