Arjun Subramonian (they/them)

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Research Interests

graph machine learning, natural language processing, fairness, biases, ethics

Education

PhD in Computer Science; University of California, Los Angeles (2021-2026), Eugene V. Cota-Robles Fellow, *GPA:* 4.0
Primary Advisor: Yizhou Sun
Secondary Advisor: Kai-Wei Chang

BS in Computer Science; University of California, Los Angeles (2018-2021), *GPA:* 3.927, Summa Cum Laude

Work Experience

Research Intern, FAIR Society and Responsible AI (2022)
Location: Paris, France

Research Intern, Microsoft Research FATE (2022)
Location: Montréal, Québec, Canada

Machine Learning Researcher, UCLA Scalable Analytics Institute (2019-)
Location: Los Angeles, California

Machine Learning Researcher, UCLA NLP (2020-)
Location: Los Angeles, California

Research Engineering Intern, AllenNLP, Allen Institute for Artificial Intelligence (2021)
Location: Seattle, Washington
Description: I developed AllenNLP's fairness library, which makes fairness metrics, training-time fairness algorithms, bias mitigation algorithms, and bias metrics accessible to researchers and practitioners of all levels. I also wrote a guide chapter, documentation, and a blog post to communicate my work and make usage of the fairness library accessible.

Privacy Research Intern, Snap, Inc. (2021)
Location: Los Angeles, California
Description: I developed algorithms to improve the safety of friend suggestions for underage users on Snapchat while preserving the privacy of all users. I further contributed to the development of Snap's Responsible AI principles. I also worked on machine learning for ads and monetization.

Software Engineering Intern, Microsoft Corporation (2020)
Location: Sunnyvale, California
Description: I crafted a peer-to-peer-anonymous, secure backend technical design for a feature to report harassment on Microsoft Teams.

Software Engineering Intern, Get Heal, Inc. (2019)
Location: Los Angeles, California
Description: I engineered full-stack integrations of mechanisms used every day at Heal that enhance the automated routing of medical providers, like automated triaging, doctor-assistant match prevention, and phone number verification. I also adapted Heal's automated routing algorithm to optimally schedule telemedicine visits, which greatly benefits patients during the COVID-19 pandemic.

Deep Learning Engineer, Sike AI (2018-2019)
Location: Los Angeles, California
Description: I designed, implemented, and trained the in-house deep learning model for working style-analysis from video with TensorFlow.

Publications

Talat, Zeerak, Aurélie Névéol, Stella Biderman*, Miruna Clinciu*, Manan Dey*, Shayne Longpre*, Alexandra Sasha Luccioni*, Maraim Masoud*, Margaret Mitchell*, Dragomir Radev*, Shanya Sharma*, **Arjun Subramonian***, Jaesung Tae*, Samson Tan*, Deepak Tunuguntla*, Oskar van der Wal*. "**You Reap What You Sow: On the Challenges of Bias Evaluation Under Multilingual Settings**." Accepted to **Challenges & Perspectives in Creating Large Language Models @ ACL 2022**.

Subramonian, Arjun. "**On Dyadic Fairness: Exploring and Mitigating Bias in Graph Connections**." Accepted to **ICLR 2022 Blogpost Track (32% acceptance rate)**.

Dev, Sunipa, Masoud Monajatipoor*, Anaelia Ovalle*, **Arjun Subramonian***, Jeff M Phillips, and Kai-Wei Chang. "**Harms of Gender Exclusivity and Challenges in Non-Binary Representation in Language Technologies**." Accepted to **EMNLP 2021 (Oral – 9.8% acceptance rate)**, **WiML Un-Workshop @ NeurIPS 2021**.

Subramonian, Arjun. "**Fairness and Bias Mitigation: A practical guide into the AllenNLP Fairness module**."

Zhang, Shichang, Ziniu Hu, **Arjun Subramonian**, and Yizhou Sun. "**Motif-Driven Contrastive Learning of Graph Representations**." Accepted to **SSL@WWW2021**.

Subramonian, Arjun. "**MOTIF-Driven Contrastive Learning of Graph Representations**." Accepted to **Undergraduate Consortium @ AAAI 2021**.

Brown, Calvin, Derek Tseng, Paige M. K. Larkin, Susan Realegeno, Leanne Mortimer, **Arjun Subramonian***, Dino Di Carlo, Omai B. Garner, and Aydogan Ozcan. "**Automated, Cost-Effective Optical System for Accelerated Antimicrobial Susceptibility Testing (AST) Using Deep Learning**." **ACS Photonics 2020** 7 (9), 2527-2538 DOI: 10.1021/acsphotonics.0c00841

Crandall, Sara, Graeme H. Smith, **Arjun Subramonian**, Kelly Ho, and Evelyn M. Cochrane, "**Estimating the Ages of FGK Dwarf Stars Through the Use of GALEX FUV Magnitudes**." **Astronomical Journal 2020** 160, 217, DOI: https://doi.org/10.3847/1538-3881/abb77d

QueerInAI, Organizers of, Hetvi Jethwani*, **Arjun Subramonian***, William Agnew*, MaryLena Bleile*, Sarthak Arora*, Maria Ryskina*, Jeffrey Xiong*. "**Queer in AI**." **XRDS: Crossroads, The ACM Magazine for Students, Volume 28, Issue 4**.

QueerInAI, Organizers of, Ashwin S*, William Agnew*, Hetvi Jethwani*, and **Arjun Subramonian***. "**Rebuilding Trust: Queer in AI Approach to Artificial Intelligence Risk Management**." **Queer in AI Workshop @ NeurIPS 2021**.

QueerInAI, Organizers of, A Pranav, MaryLena Bleile, **Arjun Subramonian**, Luca Soldaini, Danica Sutherland, Sabine Weber, Pan Xu, William Agnew, Michael McKenna, and Nyx McLean. "**How to Make Virtual Conferences Queer-Friendly: A Guide**." Accepted to **WiNLP 2021 Workshop @ EMNLP 2021**.

Subramonian, Arjun. "**Queer | Inclusive | Badass**." Accepted to **Resistance AI Workshop @ NeurIPS 2020**.

Invited Talks and Panels

2022 - "Gender as a Variable in NLP" Panel, **NAACL 2022 Queer in AI Workshop**
2022 - Prioritizing Grassroots D&I Activism: Queer in AI, **Microsoft Research Montréal Diversity, Inclusion, Belonging Meeting**
2022 - Guest Lecture: Bias in Natural Language Processing, **COM SCI 263: NLP, UCLA**
2022 - UPE Graduate School Panel, **UCLA**
2022 - Co-Opting AI: Queer, **NYU's Institute for Public Knowledge**
2022 - Queer in AI: Making AI Queer-Inclusive and Prioritizing Grassroots D&I Activism, **Humlab, Umeå University**
2022 - Prioritizing Grassroots D&I Activism: Queer in AI, **AAAI 2022 Workshop on Diversity in Artificial Intelligence**
2022 - Prioritizing Grassroots D&I Activism: Queer in AI and "How Do We Improve DEI in AI?" Panel, **Nike Sport+AI Conference**
2022 - Rebuilding Trust: Making Artificial Intelligence Queer-Inclusive, **QWER Hacks 2022**
2021 - Eye on A.I.: Equity & Inclusion in A.I. Technology, **Toronto Public Library**
2021 - ACM AI at UCLA Research Panel, UCLA
2021 - Harms of Gender Exclusivity and Challenges in Non-Binary Representation in Language Technologies, **EMNLP 2021**
2021 - Safer Privacy-Preserving Friend Suggestions, **Snap, Inc.**
2021 - Machine Learning Justice, **Catalysts for Change**
2021 - How Can I Make My Hackathon Queer-Inclusive? (Slides, Video), **Hackcon IX**
2021 - Intersectionality Panel, **NAACL 2021**
2021 - Queer in AI Inclusive Conference Guide DEI Update, **Allen Institute for Artificial Intelligence**
2021 - Queer in AI Panel, **UCLA**
2020 - Fair Machine Learning, **Microsoft Garage Brown-Bag**
2019 - An Automated and Cost-Effective System for Early Antimicrobial Susceptibility Testing Using Optical Fibers and Deep Learning, **UCLA HHMI Day 2019**

Honors and Awards

2022 - AI2 Outstanding Intern of the Year Award (1 of 3 interns recognized)
2021 - MLH Top 50 Class of 2021
2021 - UCLA Samueli School-Wide Outstanding Bachelor of Science
2021 - UCLA Chancellor's Service Award
2021 - UCLA Samueli Engineering Achievement Award in Student Welfare
2021 - Eugene V. Cota-Robles Fellowship, UCLA
2021 - Graduate Research Assistantship, UCLA
2021 - Boeing Company Scholarship, UCLA
2021 - Brian J. Lewis Endowment, UCLA
2020 - Computing Research Association Outstanding Undergraduate Researcher Honorable Mention
2020 - AAAI Undergraduate Consortium (1 of 14 accepted out of 82 applicants)
2020 - IBM Quantum Challenge (1 of 574 winners out of 1745 participants)
2020 - Out for Undergrad Tech Conference (1 of 300 accepted applicants)
2020 - Google Queer Tech Voices Conference (1 of 32 accepted out of hundreds of applicants)
2019 - 3rd Place Award for Best Hack @ Rose Hack, Major League Hacking
2018-2021 - Dean's Honors List
2017 - Siemens Competition Regional Finalist (1 of 101 finalists selected from 4092 entrants)
2016 - Award of Achievement, Association for Computing Machinery, San Francisco Bay Area Professional Chapter

Other Research Projects

Subgroup Excess Risk Bound of Linear Regression with Constant-Stepsize SGD (2022)
Collaborators: Quanquan Gu
Location: UCLA Machine Learning
Description: We theoretically characterize the inherent generalization disparities of linear regression with constant-stepsize SGD (with iterate averaging) across subgroups of the population from which training instances are sampled. We prove the excess risk bound for an arbitrary subgroup in terms of the data covariance matrices of the subgroup and population. We additionally present a novel interpretation of the subgroup excess risk bound, with implications for trustworthy machine learning.

On the Discrimination Risk of Mean Aggregation Feature Imputation in Graphs (2022)
Collaborators: Yizhou Sun, Kai-Wei Chang
Location: UCLA Scalable Analytics Institute
Description: We prove that a higher discrimination risk (i.e. distinction in features between groups) can amplify the unfairness of a machine learning model trained on imputed data. We formalize a general graph feature imputation framework called mean aggregation imputation and theoretically and empirically characterize graphs in which applying the framework can yield a high discrimination risk. We propose a simple and effective solution to ensure mean aggregation-imputed features provably have a low discrimination risk (while minimally sacrificing utility) and improve the fairness of models.

Explaining Attention-Based Graph Neural Networks Post-Hoc With Attention Flows (2022)
Collaborators: Paymon Haddad, Brian Tagle, Yizhou Sun
Location: UCLA Scalable Analytics Institute
Description: We propose a simple mechanism based on attention flows, which are Shapley value explanations, to augment the post-hoc interpretability of attention-based graph representation learning models by identifying nodes in the input graph that contribute most to predictions.
Notes: **Report**

Selecting Core Subgraphs for Efficient Graph Neural Network Training (2021-2022)
Collaborators: Harsh Chobisa, Yizhou Sun, Baharan Mirzasoleiman
Location: UCLA Scalable Analytics Institute
Description: We developed algorithms to condense large networks into small, (possibly synthetic) graphs that, when used to train a graph neural network, can yield comparable test performance with more efficient training.
Notes: **Report**, **Theoretical Analysis**

Expressive Graph Transformers (2020-2021)
Collaborators: Ziniu Hu, Yizhou Sun
Location: UCLA Scalable Analytics Institute
Description: I empirically and theoretically studied the effect of different types of handcrafted and adaptive relational information for relation-aware self-attention on improving the expressiveness and performance of graph Transformers, particularly on NP-hard graph problems. As part of this project, I implemented and trained a multi-GPU graph Transformer model using PyTorch.

Twitter Saliency Algorithm: Identifying Unintentional Harms to Gender Non-Conforming Individuals (2021)
Collaborators: Michael McKenna
Description: We attempted to uncover unintentional harms of the Twitter saliency algorithm, e.g. 1) identifies images of potentially-cis or binary-presenting individuals as more salient than those of gender non-conforming folks, 2) identifies undesirable secondary sex characteristics of gender non-conforming individuals that may trigger body dysphoria.
Notes: **Report**

Heterogeneous Graph Transformer (2020)
Collaborators: Ziniu Hu, Yizhou Sun
Location: UCLA Scalable Analytics Institute

Description: I adapted the implementation of the Heterogeneous Graph Transformer (HGT) to efficiently embed web-scale knowledge graphs (e.g. YAGO, DBpedia) for link prediction and ran R-GCN baselines. Additionally, I prepared an OGB leaderboard submission in which I applied HGT to the ogbl-ppa dataset.

Robust Model-Agnostic Meta-Learning for Binary Content Moderation Tasks in Natural Language Processing (2020)
Collaborators: John Dang, Kai-Wei Chang
Location: University of California, Los Angeles
Description: We investigated applying Model-Agnostic Meta-Learning (MAML) to boost performance on binary content moderation tasks in low-resource contexts. Using PyTorch, we compared the ability of a model pre-trained with MAML to adapt to unseen binary content moderation tasks to those of a model pre-trained using traditional transfer learning approaches and a model trained from scratch.
Notes: **Report**

MovieLens Recommender System (2019)
Collaborators: Amit Mondal, Bryan Chiang, John Dang, Jyun-Yu Jiang, Wei Wang
Location: University of California, Los Angeles
Description: We created a recommender system to predict the binary rating for 4M unseen UserID-MovieID pairs in the MovieLens dataset. We surveyed the performance of content-based (e.g. TF-IDF, genre-based decision tree, etc.) and collaborative filtering (e.g. SVM, SVD, element-wise matrix factorization, tabular matrix factorization, hybrid matrix factorization, etc.) methods. **We achieved the third highest ROC-AUC on the test set in our data mining class.**
Notes: **Report**

Service

Reviewing (2022-)
Description: I was/am a reviewer for: FAccT 2022, TrustNLP @ NAACL 2022, Challenges & Perspectives in Creating Large Language Models @ ACL 2022, NAACL Student Research Workshop (SRW) 2022, Workshop on Online Abuse and Harms @ NAACL 2022

Affinity Workshops Chair, NeurIPS 2022 (2022)
Location: New Orleans, Louisiana
Description: I am serving as an Affinity Workshops Chair for NeurIPS 2022.

Core Organizer, Queer in AI (2021-)
Location: Virtual
Description: I organize workshops and socials at AI conferences (e.g. AAAI 2021, ICML 2021, NeurIPS 2021, FAccT 2022, NAACL 2022, ICML 2022), as well as the undergraduate mentoring program, which gets junior queer and trans folks involved with AI research and aids them in applying to graduate school. Additionally, I advise AI conferences on diversity and inclusion and accessibility issues and help shape AI policy as it concerns queer and trans communities. The work I do with Queer in AI has been featured by 500 Queer Scientists.

Accessibility Chair, NAACL 2022 (2021-2022)
Location: Seattle, Washington
Description: I am serving as an Accessibility Chair on NAACL 2022's Diversity and Inclusion committee, ensuring in-person and digital accessibility for the conference. I authored guidelines on: Publication Accessibility, Quality, and Inclusivity, Poster and Talk Accessibility, Quality, and Inclusivity.

Queer and Trans in STEM Representative, UCLA Samueli Standing Committee on Diversity (2021-)
Location: University of California, Los Angeles
Description: I am working towards dropping the GRE requirement for graduate school admissions.

UCLA Engineering Scholarship Application Reviewer (2021)

AllenNLP Hacks Organizer, AllenNLP (2021)
Location: Seattle, Washington
Description: I helped organize AllenNLP Hacks, a hackathon to connect with marginalized students, welcome them into AllenNLP's open-source community, bring their perspectives to AllenNLP's research, and encourage them to apply to intern and work with AllenNLP.

Organizer, UCLA Computer Science Summer Institute (2021-2022)
Location: Los Angeles, California
Description: I have interviewed and recruited a diverse group of Undergraduate Tutors each year for the UCLA Computer Science Summer Institute (CSSI), to lead interactive coding and problem-solving sessions with the high school students.

Outreach Director, ACM AI at UCLA (2019-2021)
Location: Los Angeles, California
Description: I strive to make an AI education accessible to everyone. I created, led, and taught open-source, accessible machine learning and AI ethics classes at Title I schools in LA, through in-person visits, virtual sessions, and educational technology (e.g. mean-squared error, convolutional filters, biases in machine learning, etc.) I also created and produced the "You Belong in AI!" podcast, which empowers marginalized youth to pursue AI opportunities through inspiring interviews with researchers. The podcast has been featured by the Daily Bruin and UCLA Samueli Newsroom.

Co-Founder and Organizer, QWER Hacks (2019-2021)
Location: Los Angeles, California
Description: I co-founded and organized Major League Hacking's first-ever LGBTQIA+ event and the first student-run, collegiate LGBTQIA+ hackathon in the US. QWER Hacks has been featured by the Daily Bruin and the UCLA Samueli Newsroom.

Undergraduate Learning Assistant (2018)
Location: Los Angeles, California
Description: I led weekly recitation sections of 20 students for the introductory computer science class (programming in C++), walking through practice problems and actively applying pedagogy techniques (e.g. open questioning, fostering belonging, etc.)

References

Yizhou Sun (yzsun@cs.ucla.edu)
Kai-Wei Chang (kwchang@cs.ucla.edu)
Aydogan Ozcan (ozcan@ucla.edu)