

Arjun Subramonian (they/them)

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Research Interests

graph machine learning, natural language processing, fairness, privacy, ethics, efficiency

Education

PhD in Computer Science; University of California, Los Angeles (2021-), Eugene V. Cota-Robles Fellow

Advisors: Yizhou Sun, Kai-Wei Chang

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

Work Experience

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

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/acsp Photonics.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, Ashwin*, William Agnew*, Juan Pajaro*, and **Arjun Subramonian***. "**Rebuilding Trust: Queer in AI Approach to Artificial Intelligence Risk Management.**" NIST AI Risk Management RFI.

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.

Talks and Panels

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

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

Ongoing Research Projects

Graph Condensation for Efficient Graph Neural Network Training (2021-)

Collaborators: Harsh Chobisa, Yizhou Sun, Baharan Mirzasoleiman

Location: UCLA Scalable Analytics Institute

Description: We are developing algorithms to condense large networks into small, synthetic graphs that, when used to train a graph neural network, can yield comparable test performance with more efficient training.

Species Reidentification via Graph Machine Learning (2021-)

Collaborators: Sara Beery, Chuck Stewart, Shane Lubold, Peter Kulits, Jake Wall

Location: Caltech Computational Vision Laboratory

Description: I am applying graph machine learning to elephant co-sightings to contextualize and improve elephant reidentification.

Analyzing Biases via Attention Flows (2021-)

Collaborators: Sunipa Dev, Kai-Wei Chang

Location: UCLA NLP

Description: I am exploring how attention flows in large language models correlate with bias metrics and are affected by bias mitigation.

Expressive Graph Transformers (2020-)

Collaborators: Yizhou Sun

Location: UCLA Scalable Analytics Institute

Description: I am empirically and theoretically studying 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. I am also theoretically analyzing the logical expressiveness of graph Transformers.

Learning Fair Node Representations (2020-)

Collaborators: Kai-Wei Chang, Yizhou Sun

Locations: UCLA NLP, UCLA Scalable Analytics Institute

Description: I am researching interpretable methods to provably debias pretrained graph convolutional networks (GCN) and learn fair node representations for social networks and knowledge graphs without demographics.

Relevant Course Projects

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

Core Organizer, Queer in AI (2021-)

Location: Virtual

Description: I organize workshops and socials at AI conferences (e.g. [AAAI-21](#), [ICML '21](#), [NeurIPS 2021](#)), 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](#). The work I do with Queer in AI has been featured by [500 Queer Scientists](#).

Accessibility Chair, NAACL 2022 (2021-)

Location: Seattle, Washington

Description: I am serving as an Accessibility Chair on [NAACL 2022's Diversity and Inclusion committee](#).

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)

Location: Los Angeles, California

Description: I interviewed and recruited a diverse group of Undergraduate Tutors for the inaugural [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.)

Relevant Coursework and Skills

Relevant Coursework: Fairness, Ethics, Accountability and Transparency in Natural Language Processing; Neural Networks and Deep Learning; Large-Scale Machine Learning

Relevant Skills: Python, PyTorch, PyTorch Geometric, git, shell scripting, LaTeX

References

Yizhou Sun (yzsun@cs.ucla.edu)

Kai-Wei Chang (kwchang@cs.ucla.edu)

Aydogan Ozcan (ozcan@ucla.edu)