Aroon J. Sankoh

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EDUCATION

Washington University in St. Louis, McKelvey School of Engineering *May 2025*
Bachelor of Science in Computer Science and Mathematics, GPA: 3.89
Relevant Coursework: Algorithmic Analysis, Machine Learning & Robust Mean Estimation, Probability, Real Analysis, Number Theory, Time Series Analysis, Cryptography, Artificial Intelligence, Financial Mathematics, Multi-Paradigm Programming, Compilers, Stochastic Processes, Data Structures & Algorithms, Statistical Analysis, Technical Writing

RESEARCH EXPERIENCE

Machine Learning Research Assistant, New York City, NY *May 2024 – Present*
Columbia University Software Systems Lab, Department of Computer Science
- Generated 20,000+ spoofed audios with commercial and open-source deepfake generation models to contribute to a diverse audio dataset of >1.2 million datapoints for the purpose of training a robust deepfake detection model
- Reimplemented RawGAT anti-spoofing deepfake detector on our custom dataset to compare current industry standard deepfake detectors to our lab's detector, achieving a minimum training loss of 1.98% and val loss of 1.12%
- Perturbed audios with white noise, color noise, gaussian SNR, and other adversaries for RawGAT's test set
- Tested RawGAT on bonafide audio from the In-the-Wild, VCTK, LibriSpeech, and ASRspoof2019 datasets and spoofed audio from >10 commercial and open-source deepfake generators, achieving a test accuracy of 86.65%
- Co-authored a paper titled "I Can Hear You: Selective Robust Training for Deepfake Audio Detection" discussing our lab's contribution to the study of deepfake generation models

Research Mathematician, St. Louis, MO *Jan 2024 – Present*
Washington University in St. Louis Independent Study, Math Department
- Read and solved exercises on measurable functions, discrete time martingales, stochastic integration, and jump processes in the first few chapters of Bass's *Real Analysis* and Lawler's *An Introduction to Stochastic Calculus*
- Simulated Brownian motion and basic stochastic differential equations with R and Python to model option prices, migration patterns, temperature fluctuations, and other random events
- Derived a novel solution of the Ornstein-Uhlenbeck stochastic differential equation and implemented it with Sage
- Modeled SPY minute tick data with Ornstein-Uhlenbeck and jump diffusion processes by comparing traditional parameter estimation techniques like Kalman filter and MLE with deep learning methods like a deep neural network

Machine Learning Research Assistant, St. Louis, MO *Jan 2023 – May 2023*
Washington University in St. Louis Independent Study, Computer Science Department
- Built an end-to-end speech recognition model inspired from Baidu's Deep Speech 2 that transcribed clean English audio files with 81% accuracy, my model takes in an audio file, augments the data to combat model overfitting, employs a loss function to align the transcript to the audio file, then finally evaluates the model using WER metric
- Developed a novel gradient descent algorithm to perturb audios fed into Siri, Echo, and other voice assistants, then recorded how the model interpreted perturbed audio versus regular audio
- Trained a 4-layer neural network using PyTorch that recognizes types of clothing from the FashionMNIST dataset; model achieved 91% classification accuracy on in-distribution data and 64% accuracy on out-of-distribution data

TEACHING & ADVISING

Sixth & Fifth Grade Math Tutor, St. Louis, MO *Sep 2024 – Present*
Kipp Inspire Academy Tutoring Program, Kipp Inspire Academy Middle School
- Taught fundamental operations such as multiplication, long division, exponentiation, and logarithms to multiple groups of ~3 middle-schoolers
- Increased average quantitative test scores by at least 10% through rigorous instruction of basic problem-solving techniques and fostering an active learning environment

Object-Oriented Programming in C++ Teaching Assistant, St. Louis, MO *Sep 2023 – Present*
Washington University in St. Louis, Computer Science Department
- Assisted >200 students in class by leading subsection groups, answering conceptual questions about C++ syntax and object-oriented programming principles, and providing technical support on class projects
- Hosted weekly office hours to help students approach lab instructions, teach course content, and debug faulty code
- Graded ~5 labs every two weeks by evaluating programming solutions to game simulations and a mock file system

PUBLICATIONS

Z. Zhang, W. Hao, A. Sankoh, W. Lin, E. Ortiz, J. Yang, C. Mao, "I Can Hear You: Selective Robust Training for Deepfake Audio Detection," under review in *Thirteenth International Conference on Learning Representations*, *Apr 2025*

WORK EXPERIENCE

Amazon Web Services, Boston, MA   *May 2023 – Aug 2023*
Software Development Engineer Intern, AWS EBS Data Services Snapshot Creation Team
- Developed a command line tool that parsed volume data for data backup (snapshot lifecycle) statistics, ultimately accelerating the root cause analysis process of volume snapshot create failures by at least 80%
- Decreased ticket resolution time by >50% by integrating tool into the AWS command line interface and ticket board
- Documented my project decisions and wrote a user manual to seamlessly pass my work on to future engineers
- Passed 5+ Security, Software Development, and Machine Learning AWS Engineering courses
- Presented the purpose, scope, impact, and usability of my tool to ~50 experienced EBS Software Engineers

Via Transportation, New York City, NY   *May 2022 – Nov 2022*
Product Management Intern, Expansion Team
- Tested 10+ transportation services for cities launched in the US, Canada, France, and Germany for issues and bugs and contributed to a Jira documentation board that outlined the testing procedures for private-transit cities
- Reconfigured and provided technical support for 6 transportation services in the US, France, and Germany
- Negotiated and worked with partners to expedite the pre-launch phase of services in 2 US cities
- Presented 3 data and product issues found in different services to company executives and employees

LEADERSHIP AND PROFESSIONAL DEVELOPMENT

Delta Sigma Pi Professional Fraternity, St. Louis, MO   *Sep 2021 – Present*
Vice President of Diversity & Inclusion, Rush Committee, D&I Committee
- Planned and led 5+ workshops, discussions, and trainings on topics related to identity, cultural affinity, and representation in the professional and academic world
- Implemented chapter-wide initiatives such as a Diversity in the Workplace Panel, Mental Health Programming, and a Bid Vote Committee to standardize the selection process for prospective neophytes
- Restructured the application portion of our rush process to minimize bias, contributing to a 15% increase in bids given to underrepresented minorities in higher education

Management Leadership for Tomorrow (MLT), Washington, DC   *Jan 2023 – Present*
Career Preparation Fellow, Software Engineering Track
- Selected among thousands of high-achieving applicants to participate in a Career Preparation program focused on professional and leadership development
- Completed business case studies, assignments, and interview preparation courses to improve technical skillset
- Attended conferences hosted by industry leaders such as Amazon, Apple, Jane Street, Bloomberg, and more

Takeoff Institute Fellowship, Boston, MA   *Jun 2023 – Aug 2023*
Summer Fellow, Computer Science Focus
- Participated in professional development classes and trainings geared toward boosting the careers of Black undergraduates from elite universities
- Researched significant market crashes such as the 1987 Savings & Loan Crisis and the 1998 Long-Term Capital Management bailout for a project on market cycles and building wealth through investing

Black Men's Coalition, St. Louis, MO   *Aug 2022 – Aug 2024*
Treasurer, Webmaster
- Promoted organization designation to Category I by petitioning to Student Union and highlighting BMC strengths during our category change meeting
- Planned and ran 10+ events such as community gatherings, GBMs, professional speakers, and cultural events
- Managed funds for student group through budgeting, fundraising, and maintaining records of financial transactions

HONORS AND AWARDS

Tapia Conference Scholarship Recipient	*Sep 2024*
Dean's List	*Spring 2024*
Dean's List	*Spring 2023*
AfroTech Conference Scholarship Recipient	*Nov 2023*
Dean's List	*Fall 2022*
Dean's List	*Fall 2021*