









Work Experience


- 2024 – Present  **Senior Research Engineer**, Red Hat AI Innovation.
- Founding member of the newly established Red Hat AI Innovation team, driving cutting-edge advancements in enterprise AI.
 - Leading the Synthetic Data Generation component of the RHEL AI, a platform for customizing LLMs for enterprise applications.
 - Responsible for driving innovation across all Red Hat AI products, shaping the future of Red Hat's generative AI initiatives.
- 2022 – Present  **Research Engineer**, MIT-IBM Watson AI Lab, IBM Research.
- One of the 4 core members of the Alignment Team, which is responsible for the alignment and training of IBM's Large Language Models (LLM) and generative AI.
 - Co-invented *InstructLAB*, which forms the basis of IBM and RedHat companies' generative AI strategy.
 - Co-invented *Synderella*, a differentially private synthetic data generation service on IBM WatsonX platform to solve customers' data privacy issues.
- 2020 – 2022  **Research Assistant**, Machine Learning and Computational Intelligence Lab - UC.
- Conducted EEG signal denoising and computer vision research for an NSF-funded project on brain-controlled assistive robotics for individuals with Cerebral Palsy.
 - Enhanced robotic control and interaction, significantly improving accessibility and autonomy for users with mobility challenges in a controlled study.
- 2021  **Research Assistant**, Proctor & Gamble
- Led vision model research for femcare product R&D, focusing on object detection and image segmentation.
 - Successfully deployed models provided critical insights into product usage, enhancing R&D decision-making and innovation strategies.
- 2020  **Research Intern**, CAGE Lab - Cincinnati Children's
- Focused on the structural and functional annotation of proteins, applying deep learning to enhance metalloprotein bindsite predictions.
 - Improved the accuracy of Zinc binding site predictions, advancing our understanding and potential therapeutic targeting of autoimmune diseases.
- 2019  **Research Assistant**, Next Mobility Lab - UC
- Contributed to research on connected and automated vehicles, with a focus on improving adverse weather autonomy for pedestrian detection in fog and rain.
 - Enhanced detection capabilities significantly, increasing safety and reliability of autonomous vehicles in challenging weather conditions.
-  **Research Intern**, Infinera
- Led the development of AI-driven proof of concepts for ASIC chip design, focusing on deep learning-based cooling solutions.
 - Developed models that quickly identified optimal cooling parameters for specific chip layouts and power profiles, enhancing chip performance and efficiency.

Education

- 2020 – 2022  **MS, Computer Science** University of Cincinnati (GPA: 4.0/4.0)
Thesis title: *Spatio-Temporal Analysis of EEG using Deep Learning*
Advisor: Prof. Anca Ralescu, Full Professor UC
- 2017 – 2020  **BS, Computer Science** University of Cincinnati (GPA: 3.89/4.0)
Thesis title: *Fine-grained Prediction of Topical Stance and Political Leaning from Twitter*
Advisor: Prof. Anca Ralescu, Full Professor UC
Honors: *Magna Cum Laude*, Dean's List

Publications & Patents (Google Scholar)

Preprint

- 1 **S. Sudalairaj***, A. Bhandwalidar*, A. Pareja*, K. Xu, D. D. Cox, and A. Srivastava*, *LAB: Large-Scale Alignment for ChatBots*, 2024. arXiv: 2403.01081 [cs.CL].
- 2 G. Xu, K. Xu, **S. Sudalairaj**, H. Wang, and A. Srivastava, *Cdr: Customizable density ratios of strong-over-weak llms for preference annotation*, 2024. arXiv: 2411.02481 [cs.CL].  URL: <https://arxiv.org/abs/2411.02481>.

Conference Proceedings

- 1 J. Park, K. Kahatapitiya, D. Kim, **S. Sudalairaj**, Q. Fan, and M. S. Ryoo, "Grafting vision transformers," in *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, Jan. 2024, pp. 1145–1154.
- 2 L. Han, S. Han, **S. Sudalairaj**, *et al.*, "Constructive assimilation: Boosting contrastive learning performance through view generation strategies," in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, Jun. 2023.
- 3 C. Loh, S. Han, **S. Sudalairaj**, *et al.*, "Multi-symmetry ensembles: Improving diversity and generalization via opposing symmetries," in *Proceedings of the 40th International Conference on Machine Learning*, A. Krause, E. Brunskill, K. Cho, B. Engelhardt, S. Sabato, and J. Scarlett, Eds., ser. Proceedings of Machine Learning Research, vol. 202, PMLR, 23–29 Jul 2023, pp. 22 614–22 630.
- 4 H. Wang, **S. Sudalairaj**, J. Henning, K. Greenewald, and A. Srivastava, "Post-processing private synthetic data for improving utility on selected measures," in *Advances in Neural Information Processing Systems*, A. Oh, T. Neumann, A. Globerson, K. Saenko, M. Hardt, and S. Levine, Eds., vol. 36, Curran Associates, Inc., 2023, pp. 64 139–64 154.




Journal Articles

- 1 C. Loh, R. Dangovski, **S. Sudalairaj**, *et al.*, "Mitigating confirmation bias in semi-supervised learning via efficient bayesian model averaging," *Transactions on Machine Learning Research*, 2023, ISSN: 2835-8856.
- 2 D. Corcoran, N. Maltbie, **S. Sudalairaj**, F. N. Baker, J. Hirschfeld, and A. Porollo, "Coeviz 2: Protein graphs derived from amino acid covariance," *Frontiers in Bioinformatics*, vol. 1, 2021, ISSN: 2673-7647.





Patents

- 1 A. Bhandwalidar, **S. Sudalairaj**, A. Pareja, and A. Srivastava, "Contrastive fine-tuning alignment system."
- 2 H. Wang, **S. Sudalairaj**, and A. Srivastava, "Post-processing differentially private synthetic data."

Grants





- 2023  **Research Engineer**, Generative Modeling for Complex Mechanical Systems with Constraints.
PI: Prof. Faez Ahmed (MIT), Dr. Akash Srivastava (IBM)
-  **Research Engineer**, Private Synthetic Data Generation: From Theoretical Foundations to Financial Applications
PI: Prof. Navid Azizan (MIT), Dr. Akash Srivastava (IBM), Dr. Hao Wang (IBM)
- 2022  **Research Engineer**, Learning Priors for Transfer
PI: Prof. Pulkit Agarwal (MIT), Dr. Akash Srivastava (IBM)

Teaching Experience

- 2021  **Teaching Assistant**, Machine Learning, Graduate Level
-  **Teaching Assistant**, Intro to AI, Undergraduate Level
- 2020  **Teaching Assistant**, Design & Analysis of Algorithms, Undergraduate Level
-  **Teaching Assistant**, Data Structures, Undergraduate Level

Accolades & Certifications




Awards and Achievements

- 2020 – 2022  **NSF Award**, EAGER - Exploration of Brain Computer Interface for Individuals with Cerebral Palsy, PI: Prof. Anca Ralescu
-  **UC Graduate Scholarship**, University of Cincinnati
- 2017 – 2020  **Dean's List**, University of Cincinnati
-  **UC Global Scholarship**, University of Cincinnati




Certification

- 2020  **Deep Learning Specialization**. Awarded by deeplearning.ai, Coursera

Community Contributions

- instructlab  Open-source project enabling community contributions of knowledge and skills to improve and enhance large language models
- merlinite-7b  Developed a 7 billion-parameter generative text model, acclaimed as a top-performing entry in the Mistral family according to MTBench evaluations.
Achieved over 35,000 downloads on Huggingface, under a permissible license.
- labradorite-13b  Developed a 13 billion-parameter generative text model in the Llama family, achieving over 5,000 downloads on Huggingface.

Skills

- Languages  Python
- Tools  HF Transformers, HF Datasets, HF Accelerate, TRL, Pytorch, DeepSpeed
- Misc.  OpenShift, Slurm, LSF