

Aryaman Jeendgar

+1 (628) 306-0582
Berkeley, California

Visiting Researcher @ ICSI via
UC Berkeley

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Recent-grad from BITS Pilani with a double major in Physics and Electronics & Communications Engineering with a keen interest in Applied Mathematics and engineering robust ML systems.

Personal webpage: <https://aryamanjeendgar.github.io/>

Blog: <https://aryamanjeendgar.github.io/blog.html>

EDUCATION

MSc., Physics, Birla Institute of Technology and Science

AUG 2019 — MAY 2024

B.E. (Hons.), Electrical & Communications Engineering, Birla Institute of Technology and Science

AUG 2021 — MAY 2024

SKILLS

Tools and Languages Python, C++, Numpy, CVXPY, scikit-learn, Pytorch, Git, Emacs, \LaTeX

RESEARCH EXPERIENCE

Machine Learning Research Engineer

AUG 2024 — PRESENT

International Computer Science Institute, UC Berkeley



Berkeley, California

Host: Prof. Michael Mahoney

- Working on problems in Randomized Numerical Linear Algebra and building [RandBLAS](#) & [RandLAPACK](#)

Research Fellow via Princeton University, Undergraduate Thesis

JAN 2024 — JUN 2024

CERN



Geneva, Switzerland

Host: Dr. Peter Elmer

Mentor(s): Dr. Kilian Lieret, Dr. Gage DeZoort, Dr. Henry Schreiner, Thesis

- Worked on extending the [GNN-tracking](#) pipeline for charged-particle-tracking in various ways
 - Explored the introduction of a noise-classifier module and the use of uncertainty quantification techniques for the problem
 - Explored the use of Contrastive losses for the pipeline

Research Intern

SEPT 2023 — DEC 2023

TCS Research, Division of Data & Decision Sciences



Mumbai, Maharashtra

Manager: Prof. Mayank Baranwal

- Worked on developing new second-order optimizers for deep learning using tools from control and dynamical systems theory
- Came up with the update rule, designed & implemented all experiments and assisted in theoretical analyses

Master's Thesis

AUG 2023 — DEC 2023

International Computer Science Institute, UC Berkeley



Remote

Host: Dr. Riley J. Murray, Thesis

- Worked on a variety of problems centered around the *Operator Relative Entropy Cone* and its semidefinite approximation suggested in the [paper](#), [Semidefinite Approximations of the Matrix Logarithm](#)
- Introduced dual variables for the implementation of the N-dimensional power cone `PowConeND`
- Implemented an atom for the Quantum Relative Entropy (QREP) and various other quantum information modelling functionality

Student Developer @ CVXPY

JUNE 2023 — SEP 2023

Google Summer of Code



Remote

Mentor(s): Dr. Riley J. Murray, Dr. Steven Diamond, Final Report

- Implemented new functionality within CVXPY to allow users to verify optimality conditions (such as the *KKT conditions*) for solutions output by CVXPY.
- Changes made will eventually introduce sweeping changes to the CVXPY public API.

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Summer Research Software Engineer Fellow

JUNE 2023 — SEP 2023

Princeton Research Computing 

Hybrid, Princeton, NJ

Mentor: Dr. Henry Schreiner, [CopyCuTter](#) , [UHI-serialization](#) 

- Worked on tools that are a part of the ongoing `scikit-HEP` project (an effort to port tools and functionalities from the ROOT project in C++ to python)
- Helped draft a serialization spec for the [UHI-interface](#) (which is implemented by popular histogramming libraries, including `hist` and `boost::histogram`. Implemented the serialization spec within HDF5.
- Wrote a complete textual powered TUI for the `copier` and `cookiecutter` projects, with a special focus on support for the `scientific-python/cookie` template

Graduate Technical Intern

JUNE 2022 — SEP 2022

Intel Labs, Cloud Systems Research Lab 


Bangalore, Karnataka

Manager: [Nilesh Jain](#) and collaboration with [Dr. Sameh Gobriel](#), [Exit presentation](#)

- Worked on *linearly* scaling out all the queries supported by the [VDMS](#) database.
- Wrote a *shard* mode of operation for VDMS that linearly scales out the Add queries
- Worked on the problem of optimizing Approximate Nearest Neighbor queries (as performed by [FAISS](#) and the [FLINNG](#) libraries) in this 'scaled-out' setting.
- Framed the problem of the above query optimization as an online algorithm, and researched the use of online clustering algorithms for "smarter" splitting of feature vector across different machines → was able to observe linear scalability of *Similarity Searches* (with the number of servers) with this solution.

Student Developer @ CVXPY

MAY 2022 — OCTOBER 2022

Google Summer of Code 

Remote

Mentor: [Dr. Riley J. Murray](#), [Blog for the project](#), [Final Report](#)

- Implemented a series of powerful approximation methods for [Relative-Entropy Conic](#) constraints which were suggested in [this paper](#) within CVXPY
- One of the first (efficient) implementations of the *Operator Relative Entropy* (and associated constraints and functions) within a mainstream convex modelling language

LogGENE: A smooth alternative to the check loss

AUG 2021 — FEB 2022

BITS Pilani 

Goa Campus, Dept. of CS

[Code](#) , [Pre-Print](#)

With [Prof. Snehanshu Saha](#) & [Dr. Soma S. Dhavala](#)

- Developed a novel Quantile Regression based framework around our proposed loss function in the Deep Learning setting
- Used the Gene Expression problem as a test-bed for validating our theory
- Rigorously adapted our proposed regression loss to the binary classification setting, and saw favourable results against baseline (Binary) Cross-Entropy.
- End-to-end planned and wrote the code for most of the experiments that we conducted (used PyTorch as our major driver), and contributed significantly to the theoretical framework and proofs.

MISCELLANEOUS

Selected for [IITB CSE Research Symposium, 2023](#)

REFERENCES:

- **Michael Mahoney**, VP ICSI, Group Lead Lawrence Berkeley NL, UC Berkeley Department of Statistics
WebPage: <https://www.stat.berkeley.edu/~mmahoney>
Contact: mmahoney@stat.berkeley.edu
- **Steven Diamond**, Gridmatic
WebPage: <https://stevendiamond.me/>
Contact: diamond@cs.stanford.edu
- **Riley J. Murray**, Staff Scientist, Sandia National Laboratories
WebPage: <https://rileyjmurray.wordpress.com/>
Contact: rjmurray@berkeley.edu