

Aryaman Jeendgar

(+91) 8619554470
Geneva, Switzerland

Research Fellow @ CERN via
Princeton University

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A final-year undergraduate from BITS Pilani, double majoring in Physics and Electronics and Communications Engineering with a keen interest in Applied Mathematics and engineering robust ML systems.
Personal webpage: <https://aryamanjeendgar.github.io/>


EDUCATION

Masters in Physics and Bachelors of Engineering in Electronics and Communications Engineering, *Birla Institute of Technology and Science*
AUG 2019 — PRESENT

SKILLS

Tools and Languages Python, C++, Numpy, CVXPY, scikit-learn, Pytorch, Git, Emacs, \LaTeX
Research Interests Convex Optimization, Theoretical machine learning, Control Theory, Large-Scale Optimization

PAST RESEARCH/INTERNS

Research Fellow via Princeton University, Undergraduate Thesis JAN 2024 — PRESENT
CERN  Geneva, Switzerland

Host: Dr. Peter Elmer

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

- Working on extending the GNN-tracking pipeline for charged-particle-tracking used in the LHC

Research Intern SEPT 2023 — DEC 2023
TCS Research, Division of Data & Decision Sciences  Mumbai, Maharashtra

Manager: Prof. Mayank Baranwal

- Worked on developing new optimizers for large-scale deep learning models (like LLM's).
- Explored variations of update rules leveraging second-order information to some degree so as to adapt to the multi-modality of such large-scale architectures.

Undergraduate 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 it's semidefinite approximation suggested in the paper, Semidefinite Approximations of the Matrix Logarithm

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 alterations to the CVXPY public API.

Summer Research Software Engineer Fellow JUNE 2023 — SEP 2023
Princeton Research Computing  Hybrid

Mentor: Dr. Henry Schreiner

- 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

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Graduate Technical Intern

Intel Labs, Cloud Systems Research Lab



JUNE 2022 — SEP 2022

Bangalore, Karnataka

Manager: *Nilesh Jain* and collaboration with *Dr. Sameh Gobriel*

- 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

Google Summer of Code 

MAY 2022 — OCTOBER 2022

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

BITS Pilani 

AUG 2021 — FEB 2022

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.

NLP intern @ Swecha

Swecha

MAY 2021 — JULY 2021

Gachibowli, Telangana

Code

- Came up with and implemented a heuristic-based NLP system for fake news detection.
- Partially constructed a fake news dataset for the same by scraping large volumes of data from relevantly tagged websites

MISCELLANEOUS

- Selected for *IITB CSE Research Symposium, 2023*

REFERENCES:

- **Riley J. Murray**, *Sandia National Laboratories*
WebPage: <https://rileyjmurray.wordpress.com/>
Contact: rjmurray@berkeley.edu
- **Steven Diamond**, *Gridmatic*
WebPage: <https://stevendiamond.me/>
Contact: diamond@cs.stanford.edu