Dhruv Singal

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Work Experience

Central Applied Science, Meta — *Mountain View, US*
Research Scientist — *Jun 2024 – Current*

- Applied research in Econ, Stats and ML in a central org, working on strategic projects for booking long-term impact.
- Designed novel randomized data collection systems, with applications in in financial integrity and sales.
- Delivered novel causal ML systems, improving decisioning by order of 10s/100s $MM annually.

Google X — *Mountain View, US*
AI/ML/Quant PhD Resident — *Jul 2023 – May 2024*

- Confidential Project: Financial Economics of Carbon Markets
  - Responsible for data analyses (ML, NLP, financial engineering), shaping experiments and prototyping solutions
- Confidential Project: Generative AI and Financial Stochastic Modeling
  - Integrating cutting-edge LLMs (finetuning, RAG, downstream embeddings) into traditional financial modeling analyses; worked on end-to-end prototyping and filed three patents at USPTO

Capital Fund Management International Inc. — *New York, US*
Hosted Quant Researcher — *May 2022 - May 2023*

- Produced novel firm–country level quantitative insights through semi-high frequency data on international corporate bonds from Bloomberg and Reuters, and granular trade shipments.

BigData Experience Lab, Adobe Research — *Bengaluru, India*
Research Associate — *Jun 2016 - Aug 2018*
Research Intern — *May 2015 - Jul 2015*

- Published novel research in fields spanning machine learning, computer vision, data mining, marketing
- Generated IP—8 patents accepted at USPTO—in collabration with product teams across digital advertising, document reader and creative cloud
- Integrated research code with real-time big data production systems, upstreaming into deep learning product applications

Education

Columbia Business School — *New York, US*
PhD in Finance (Quantitative Economics and Econometrics — *2018–2024*

- **Research Interests:** Asset Pricing, Macroeconomics, Information Economics, International Finance
- **Selected Courses:** Empirical Asset Pricing, Asset Pricing Theory, Continuous Time Finance, Time Series Econometrics, Macroeconomics

Indian Institute of Technology Kanpur — *Kanpur, India*
BTech in Computer Science — *2012–2016*

- **Selected Courses:** Probabilistic Machine Learning, Machine Learning Techniques, Data Structures and Algorithms, Advanced Algorithms

Selected Research Articles (Complete list on webpage)

Valuing Financial Data
The Review of Financial Studies; joint with M Farboodi, L Veldkamp and V Venkateswaran — *2024*

- Quantified a macroeconomic model with information frictions using multiple regression, to trace the demand curve for financial data for market investors
- Winner of the **SFI Outstanding Paper Award, 2022**

Symbolic Encoding of LL(1) Parsing and its Applications
Formal Methods in System Design; joint with PK Kalita, P Agarwal, S Jhunjunwala and S Roy — *2023*

- Proposed an SMT encoding of the LL(1) parsing algorithm; implemented using Python Z3

RAPID: Rapid and Precise Interpretable Decision Sets
IEEE International Conference on Big Data;
joint with S Dhamnani, T Mohandoss, M Dash and R Sinha — *2019*

- Implemented a novel frequent-pattern trees based data structure for 10,000x speed up over the baseline interpretable ML algorithm

Show and Recall: Learning What Makes Videos Memorable
IEEE International Conference on Computer Vision Workshops;
joint with S Shekhar, H Singh, M Kedia and A Shetty — *2017*

- Implemented an ensemble machine learning model using deep learning and canonical computer vision features
- Designed and maintained a responsive MEAN stack web application for crowdsourcing ground truth data