

DIVYANSH JHUNJHUNWALA

✉ djhunjhu@andrew.cmu.edu ♦  [Website](#) ♦  [Google Scholar](#)

EDUCATION

Carnegie Mellon University, Pittsburgh, USA

Ph.D. Candidate

Department of Electrical and Computer Engineering

Advisor: Dr. Gauri Joshi

Expected Graduation Date: June 2025

August 2020 - Present

GPA: 3.97/4.0

Indian Institute of Technology Kharagpur, India

Bachelor of Technology(Honors)

Department of Electronics and Electrical Communication Engineering

Minor in Computer Science

Institute Silver Medal for highest CGPA in department

July 2016 - July 2020

CGPA: 9.74/10

La Martiniere for Boys, Kolkata, India

Indian School Certificate Examination(2016)

Secured 6th highest aggregate marks all over India

April 2001 - April 2016

98.5 %

RESEARCH INTERESTS

Distributed Optimization, Machine Learning, Federated Learning

SELECTED AWARDS AND HONORS

- Selected as finalist for **Qualcomm Innovation Fellowship 2022** for research proposal on “*Incentivized Federated Learning for Data-Heterogeneous and Resource-Constrained Clients*”.
- **David H. Barakat and LaVerne Owen-Barakat College of Engineering Dean’s Fellowship** for pursuing doctoral studies at CMU for the academic year 2021-2022 and 2022-2023.
- **Carnegie Institute of Technology Dean’s Fellowship** for pursuing doctoral studies at CMU for the academic year 2020-2021.
- **Swapan Kumar Saha Memorial Prize, IIT Kharagpur** for graduating with the highest CGPA among all B.Tech students in E&ECE department.
- **Goralal Syngal Scholarship, IIT Kharagpur** for being among the top ten academic performers in the institute in the academic year 2018-2019.
- **Govt. of India INSPIRE Scholarship** for being one of the top 1% performers in the Indian School Certificate exams 2016.

PUBLICATIONS

C5. [FedFisher: Leveraging Fisher Information for One-Shot Federated Learning](#)

Divyansh Jhunjunwala, Shiqiang Wang, Gauri Joshi

International Conference on Artificial Intelligence and Statistics (AISTATS) 2024

A preliminary version appeared at FL@ICML workshop 2023

- Proposed an algorithm for learning a global model for federated learning in just one round with novel theoretical guarantees for a two-layer neural network.

C4. **FedExP: Speeding up Federated Averaging via Extrapolation**

Divyansh Jhunjunwala, Shiqiang Wang, Gauri Joshi

International Conference on Learning Representations (ICLR) 2023

Selected for spotlight presentation, top 25% of accepted papers.

- Proposed an algorithm to adaptively determine the server step size in Federated Averaging based on dynamically varying client updates throughout the federated learning process.

C3. **FedVARP:Tackling the Variance Due to Partial Client Participation in Federated Learning**

Divyansh Jhunjunwala, Pranay Sharma, Aushim Nagarkatti, Gauri Joshi

Uncertainty in Artificial Intelligence (UAI) 2022

- Proposed a novel variance reduction algorithm applied at the server to eliminate error due to partial client participation in federated learning.

C2. **Leveraging Spatial and Temporal Correlations in Sparsified Mean Estimation**

Divyansh Jhunjunwala, Ankur Mallick, Advait Gadhikar, Swanand Kadhe, Gauri Joshi

Neural Information Processing Systems (NeurIPS) 2021

- Designed estimators that utilize correlation in data across clients (spatial) and across time (temporal) to improve mean estimation at server when clients send sparsified updates.

C1. **Adaptive Quantization of Model Updates for Communication-Efficient Federated Learning**

Divyansh Jhunjunwala, Advait Gadhikar, Gauri Joshi, Yonina C. Eldar

International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2021

- Proposed AdaQuantFL, an adaptive quantization strategy to compress model updates from client to server to reduce communication cost and achieve a low training error floor in federated learning.

PREPRINTS

P2. **Erasure Coding of Neural Networks for Fast and Efficient Multi-Model Inference**

Divyansh Jhunjunwala*, Neharika Jali*, Shiqiang Wang, Gauri Joshi

Under submission

- We develop COIN, a model-fusion framework to approximate the sum of outputs of multiple neural networks with a single neural network for handling demand uncertainty in multi-model inference.

P1. **To Federate or Not To Federate: Incentivizing Client Participation in Federated Learning**

Yae Jee Cho, **Divyansh Jhunjunwala**, Tian Li, Virginia Smith, Gauri Joshi

Neural Information Processing Systems (NeurIPS) 2022 Workshop on Federated Learning

Selected for oral presentation

- We propose the IncFL framework, wherein server actively incentivizes clients to participate in federated learning training by dynamically adjusting the global aggregation procedure.

(* denotes equal contribution)

INTERNSHIPS

IBM Research, Yorktown Heights

May 2023- August 2023

Mentors: Dr. Shiqiang Wang, Maroun Touma

- Developed a Deep Q-Learning based controller to optimally allocate GPU resources between fine-tuning and inference jobs at the edge.
- Investigated various machine unlearning algorithms for practical application at IBM and led a joint team effort to develop solutions for the NeurIPS 23 Unlearning Challenge.

IBM Research, Yorktown Heights*May 2022- August 2022**Mentor: Dr. Shiqiang Wang*

- Investigated properties of over-parameterized neural networks for combating heterogeneity, promoting few-shot learning and tuning server step size in federated learning.
- Paper on tuning server step sizes was published as a spotlight presentation at ICLR 2023. Paper on one-shot federated learning is in submission.

Carnegie Mellon University, ECE Department*May 2019-July 2019**Mentors: Prof. Gauri Joshi, Prof. Osman Yagan*

- Formulated and experimentally verified a novel algorithm for learning population-level statistics while maintaining privacy of individual user samples.

RELEVANT COURSES

CMU	Advanced Introduction to Machine Learning, Convex Optimization, Intermediate Statistics, Algorithms for Big Data, Probabilistic Graphical Models, Algorithms for Large-scale Distributed Machine Learning and Optimization, Advanced Machine Learning, Foundations of Reinforcement Learning
IIT Kharagpur	Matrix Algebra, Probability and Stochastic Processes, Deep Learning Analog Communication, Digital Communication, Signals and Systems, Network Theory, Control Systems, Digital Image Processing, Artificial Intelligence, Network Optimization, Algorithms

SKILLS

Languages	C, C++, Python, MATLAB
ML Frameworks	OpenCV, TensorFlow, Keras, PyTorch, Ray

SERVICE

Journal Reviewer	IEEE Transactions on Communication, IEEE Transactions on Signal Processing, IEEE Transactions on Networking
Conference Reviewer	ICLR 2024, ICML 2023, ICML 2022, NeurIPS 2022
Workshop Reviewer	NeurIPS 23 Workshop on Federated Learning in the Age of Foundation Models, NeurIPS 22 International Workshop on Federated Learning: Recent Advances and New Challenges

TEACHING

Graduate Teaching Assistant, Carnegie Mellon University

- 18-661: Intro to Machine Learning for Engineers

Fall 2022, Fall 2024