Utkarsh Yashvardhan

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Education

Georgia Institute of Technology — **Atlanta, Georgia**
M.S. Computer Science (Specialization: Machine Learning), 3.87/4 — *Aug. 2024 – Dec. 2026 (Expected)*

Birla Institute of Technology and Science (BITS), Pilani — **Pilani, Rajasthan**
M.Sc. Mathematics & B.E. Computer Science (Dual Degree), 8.47/10 — *Aug. 2019 – May 2024*

Experience

Academic

BITS Pilani Digital (B.Sc. Computer Science) — **BITS Pilani**
Teaching Assistant - Network Programming and Client-Server Programming — *Sep. 2026 – Present*
Teaching Assistant - Command Line Interface & Scripting — *May 2024 – Jul. 2024*
Lead Teaching Assistant - Object Oriented Programming — *Feb. 2024 – Apr. 2024*

Department of Computer Science & Information Systems — **BITS Pilani**
Teaching Assistant - Data Structures & Algorithms — *Jan. 2024 – May 2024*
Teaching Assistant - Computer Programming — *Aug. 2023 – Dec. 2023*

BITS IoT Lab — **BITS Pilani**
Research Assistant — *May 2023 – Jul. 2023*

- Analyzed **generative models** (ChatGPT, DALL-E, etc.) for **cybersecurity applications** and risks; resulted in an **IEEE Access publication** (2024).

Open Source

JuliaTopOpt/SimpleTopOpt.jl — **Remote**
Collaborator — *Feb. 2024 – Jun. 2024*

- **Translated** complex **MATLAB**-based **topology optimization** models (3D, stress, and buckling) into **Julia** using established academic literature.
- **Benchmarked** the **computational efficiency** of the newly developed Julia implementations against their MATLAB counterparts.

Publications

2024: **Generative AI for Cyber Security: Analyzing the Potential of ChatGPT, DALL-E and Other Models for Enhancing the Security Space** | Siva Sai, Utkarsh Yashvardhan, Vinay Chamola, and Biplab Sikdar, IEEE Access, 2024 [DOI]

Thesis (BITS Pilani)

Title: *Bokeh Rendering using Federated Learning*

Supervisor: Dr Pratik Narang

Co-supervisors: Dr Jagat Sesh Challa (Aug. – Dec. 2023), Dr Rakhi (Jan. – May 2024)

- Engineered **privacy-preserving Federated Learning (FL)** architectures from centralized vision models (**BRViT** & **Stacked DMSHN**) using the **Flower** framework.
- Integrated a **ViT-Large backbone** into BRViT, improving the centralized **PSNR** from **24.76 to 24.89**.
- Achieved **24.42 PSNR** and **0.894 SSIM** in a **3-client federated simulation** on the **EBB! dataset**, close to the centralized baseline, **while keeping user data local**.

Projects

Georgia Institute of Technology **Atlanta, Georgia**

Machine Learning Algorithms & Analysis *Fall 2025*

`Python, PyTorch, Scikit-learn, mlrose-hiive, OpenAI Gym`

- Built scalable **Neural Networks** and **SVMs**, optimizing weights via **Simulated Annealing** and **Randomized Hill Climbing**.
- Benchmarked **K-Means** and **GMMs** using **ARI/NMI** scoring, extracting latent features via **PCA, ICA, and RP**.
- Solved Markov Decision Processes (MDPs) by evaluating Model-Based (**Value/Policy Iteration**) and Model-Free (**Q-Learning, SARSA**) algorithms.

Network Science and Graph Machine Learning *Summer 2025*

`Python, NetworkX, PyTorch Geometric, Scikit-learn, EoN`

- Evaluated empirical **small-world** networks and benchmarked **community detection** algorithms (**Louvain**, **K-Clique**) using **NMI** scoring.
- Simulated **SIS epidemic outbreaks** on human contact networks via **EoN** to analyze transmission dynamics.
- Engineered **Graph Attention Networks (GATs)** and label propagation models for graph-based **NLP** tasks.

Bayesian Estimation of Differential Equations *Fall 2024*

`Julia, Turing.jl, OrdinaryDiffEq.jl, Bayesian Inference, MCMC`

- Simulated non-linear **SEIR** compartmental disease models using **OrdinaryDiffEq.jl**.
- Executed **Bayesian parameter estimation** on noisy data utilizing **Turing.jl** and the **NUTS MCMC** algorithm.
- Validated estimations through **data retrodiction**, generating posterior ensembles to **quantify uncertainty**.

Technical Skills

Languages: C/C++, Python, Julia, MATLAB, Java, C#, SQL

ML & Scientific: PyTorch, Flower, NumPy, Scikit-learn, Qiskit, PyMC, NetworkX, Pandas, Matplotlib

Developer Tools: Git, VS Code, Jupyter Notebook, IntelliJ IDEA, Unity, LaTeX

Scholarship

BITS Pilani **Pilani, Rajasthan**

Merit Scholarship (II Semester 2019-2020) *Feb. 2021*

Merit Scholarship **(≈ Rs 70,000; 40% tuition waiver)** awarded to the **top 2%** of the batch.

Leadership

Microsoft Learn Student Ambassadors **BITS Pilani Chapter**

Competitive Coding SIG Co-lead *Aug. 2021 – Apr. 2022*

References

Ref 1: **Dr Pratik Narang**
Associate Professor, Department of Computer Science & Information Systems
BITS Pilani, Pilani Campus
Email: pratik.narang@pilani.bits-pilani.ac.in
Relationship: Thesis Advisor

Ref 2: **Dr Siva Sai**
Research Fellow, Department of Electrical and Computer Engineering
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Relationship: Co-author & Direct Research Mentor

Ref 3: **Dr Vinay Chamola**
Associate Professor, Department of Electrical & Electronics Engineering
BITS Pilani, Pilani Campus
Email: vinay.chamola@pilani.bits-pilani.ac.in
Relationship: Research Advisor & Co-author