

UTKARSH NATH

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EDUCATION

Arizona State University	<i>May 2026</i>
Doctor of Philosophy, Computer Science.	GPA: 4.0
New York University	<i>May 2021</i>
Master of Science, Computer Science	GPA: 3.96
Delhi Technological University	<i>May 2018</i>
Bachelor of Technology, Information Technology.	CGPA: 7.89

INDUSTRY RESEARCH EXPERIENCE

LinkedIn	Mountain View
<i>PhD GenAI Research Intern</i>	<i>May 2025 - Aug 2025</i>
• Proposed Agentic Memory RAG (AMRAG) : a domain-aware RAG framework combining semantic and relational memory within a schema-bounded planning paradigm for global query resolution.	
• Designed a dual-memory indexing strategy using embedding-based semantic memory and relational storage, eliminating expensive LLM calls at ingestion time.	
• Developed a retrieval-time compiler that transforms each query into a deterministic DAG with three bounded operations: Semantic Search, Relational Query, and LLM Synthesis.	
• Outperformed state-of-the-art RAG pipelines on LinkedIn Recruiter data, achieving 33% higher accuracy, 2.6× faster indexing, and up to 150× lower cost.	

ACADAMIC RESEARCH EXPERIENCE

Advancing 3D Asset Generation with Multi-Object Decomposition	Oct 2024 - Sept 2025
<i>In Submission ICLR 2026</i> [project]	
• Pioneered a theoretical framework for compositional 3D generation, identifying and empirically validating that conflicting gradients in prior optimization heuristics lead to predictable failures.	
• Designed a novel staged optimization curriculum that resolves these gradient conflicts by decoupling the learning of scene structure from object-level refinement.	
• Achieved state-of-the-art results in complex 3D asset generation, demonstrating a 73% user preference on multi-object prompts and doubling text-alignment scores over prior methods.	

Deep Geometric Moments Promote Shape Consistency in Text-to-3D Generation.	Jan 2024 - Aug 2024
<i>WACV 2025</i> [paper] [project]	
• MT3D: A 3D Gaussian-based 2D lifting technique that leverages a high-fidelity 3D object to explicitly infuse geometric knowledge into text-to-3D image generation.	
• Utilizes ControlNet and Geometric moment analysis to optimize and refine the shape and structure of 3D objects, effectively alleviating the Janus problem.	
• Surpassing other state-of-the-art text-to-3D generators, MT3D significantly reduces geometric inconsistencies, delivering superior shape, high-fidelity, and enhanced photorealism.	

Polynomial Implicit Neural Framework for Promoting Shape Awareness in Generative Models	<i>Aug 2023 - Aug 2024</i>
<i>International Journal of Computer Vision</i> [paper]	
• Poly-INR: The first INR-based model designed to represent complex shapes within large, diverse datasets such as ImageNet.	
• Employs a geometric moment-based module to generate high-fidelity images without using convolution, upsample, or self-attention layers.	
• Achieved performance on par with state-of-the-art GAN models on the ImageNet dataset, with $3 - 4 \times$ fewer parameters.	

Learning Low-Rank features for Thorax Disease Classification	June 2023 - May 2024
<i>NeurIPS 2024</i> [paper]	<i>Collaboration with Mayo Clinic</i>
• Proposed low-rank feature learning (LRFL) to enhance generalization in pre-trained models.	
• Achieved SOTA results on three medical benchmarks: NIH-ChestX-ray14, CheXpert, and CovidX.	
• Improved AUC by 1-2% over counterparts under a low-data regime with the low-rank model.	

RNAS-CL: Robust Neural Architecture Search by Cross-Layer Knowledge Distillation	Mar 2022 - Dec 2022
<i>International Journal of Computer Vision</i> [paper]	
• RNAS-CL: The first NAS method that optimizes adversarial robustness and prediction accuracy without robust training	
• Extends standard Knowledge Distillation by learning student-teacher cross connections	
• Achieves SOTA results in terms of clean accuracy, robust accuracy and model size on CIFAR-10 and ImageNet dataset	

- Proposed Adjoined Network (AN), a One-shot learning paradigm to compress and regularize any CNN-based architecture
- Enhanced AN: Differential Adjoined Network, a NAS technique applied over AN to obtain the optimal compressed architecture
- Achieves accuracy comparable to current SOTA structured pruning methods but with $2\times$ fewer parameters

WORK EXPERIENCE

Samsung Research <i>Software Engineer</i>	New Delhi <i>July 2018 - July 2019</i>
• Led a team of three to build a mobile application to interact and control internal functioning of Samsung Smart TV through wireless(wifi-direct) and wired connection	
• Features of application involved controlling factory settings, fetching serial logs, running internal tests and fixing them	
Coding Blocks <i>Algorithm Instructor</i>	New Delhi <i>Aug 2017 - July 2019</i>
• Conducted Launchpad course for C++: Data Structures, Algorithms, Object Oriented Programming	
• Taught batch of 60 students at a time: includes preparing assignments, quizzes, doubt-solving sessions	
Google Summer of Code, FOSSASIA <i>Student Developer</i>	New Delhi <i>May 2017 - Aug 2017</i>
• Worked on Open-Event project, which aims to develop automated tool for creation of app and website for conferences. Part of the team responsible for frontend development and designing of the tool	
• Used Semantic UI components to build responsive UI, EmberJS in back-end and GitHub for version control	

PUBLICATIONS AND PATENT

- **Utkarsh Nath**, Rajeev Goel, Eun Som Jeon, Changhoon Kim, Kyle Min, Yezhou Yang , Yingzhen Yang and Pavan Turaga. Deep Geometric Moments Promote Shape Consistency in Text-to-3D Generation. *WACV 2025*.
- **Utkarsh Nath**, Rajhans Singh, Ankita Singh, Kuldeep Kulkarni and Pavan Turaga. Polynomial Implicit Neural Framework for Promoting Shape Awareness in Generative Models. *International Journal of Computer Vision (IJCV)*
- Yancheng Wang*, Rajeev Goel *, **Utkarsh Nath**, AC Silva, Teresa Wu and Yingzhen Yang. [Learning Low-Rank Feature for Thorax Disease Classification](#) *NeurIPS 2024*
- Jinyung Hong, Eun Som Jeon, Changhoon Kim, Keun Hee Park, **Utkarsh Nath**, Yezhou Yang, Pavan K. Turaga and Theodore P. Pavlic. [Debiasing Global Workspace: A Cognitive Neural Framework for Learning Debiased and Interpretable Representations](#) *NeurIPS 2024 Workshop on Behavioral Machine Learning 2024*
- **Utkarsh Nath**, Yancheng Wang, Pavan Turaga and Yingzhen Yang. [RNAs-CL: Robust Neural Architecture Search by Cross-Layer Knowledge Distillation](#) *International Journal of Computer Vision (IJCV)*, June 2024
- **Utkarsh Nath**, Yancheng Wang and Yingzhen Yang. [Neural Architecture Search Finds Robust Models by Knowledge Distillation](#) *Uncertainty in Artificial Intelligence (UAI) 2024*
- **Utkarsh Nath**, Yancheng Wang and Yingzhen Yang. [RNAs-CL: Robust Neural Architecture Search by Cross-Layer Knowledge Distillation](#). *ICLR 2023 Workshop on Pitfalls of limited data and computation for Trustworthy ML*. 2023.
- **Utkarsh Nath**, Shrinu Kushagra and Yingzhen Yang. [Adjoined Networks: A Training Paradigm with Applications to Network Compression](#). *AAAI Spring Symposium 2022*
- Deep Geometric Moment for 3D Generative AI. *U.S. Provisional Pat. Ser. No. 63/860,593, filed August 2025*
- Method and system for guided breathing from audio data. *U.S. Provisional Pat. Ser. No. 63/087,930, filed October 2020*

SKILLS

Languages: C/C++, Java, Python, Javascript, HTML/CSS, Swift

Libraries: Pytorch, Numpy, Pandas, Scikit Learn, OpenCV, Matplotlib

Other Tools: MySQL, Android, Xcode, Linux, Git

SERVICES

- Reviewer NeurIPS 2024, NeurIPS 2025, WACV 2025, ICLR 2025, ICML 2025, IEEE Transactions on Information Forensics and Security, IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- Teaching Assistant for Data Structures and Algorithm (CSE 310) ASU, Foundation of Machine Learning (CSE 475) ASU, Statistical Machine Learning (CSE 575) ASU and Introduction to programming (CS 1114) NYU.
- Google facilitator for Applied CS with Android for DTU, 2017