

Minkyu Choi

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EDUCATION

The University of Texas at Austin

Austin, TX

Ph.D. in Electrical and Computer Engineering

Expected: 2026

- *Research Interest: Video Generation, Neuro-symbolic AI, Multi-modal Reasoning and Understanding*
- *Advisor: Dr. Sandeep Chinchali*

Georgia Institute of Technology

Atlanta, GA

M.S. in Analytics

2018 – 2021

Baruch College

New York, NY

B.B.A. in Computer Information Systems

2014 – 2017

PUBLICATIONS

1. **M. Choi***, S. P. Sharan*, S. Shah, H. Goel, M. Omama, and S. Chinchali. “Neuro-Symbolic Evaluation of Text-to-Video Models using Formal Verification”. *arXiv preprint (arXiv:2411.16718, under review)*
2. M. Omama, P. Li, H. Goel, **M. Choi**, B. Chalaki, V. Tadiparthi, H. N. Mahjoub, E. M. Pari, and S. Chinchali. “Memory-Efficient Image Retrieval with Text-Enhanced Compression”. *Preprint, under review*
3. **M. Choi**, H. Goel, M. Omama, Y. Yang, S. Shah, and S. Chinchali. “Towards Neuro-Symbolic Video Understanding”. 2024 European Conference on Computer Vision (ECCV24), accepted for oral presentation
4. **M. Choi***, Y. Yang*, N. Bhatt*K., Gupta, S. Shah, A. Rai, D. Fridovich-Keil, U. Topcu, and S. Chinchali. “Privacy-Constrained Video Streaming”. *Preprint, under review*
5. A. Narayanan, P. Kasibhatla, **M. Choi**, P. Li, R. Zhao, and S. Chinchali. “PEERNet: An End-to-End Profiling Tool for Real-Time Networked Robotic Systems”. 2024 International Conference on Intelligent Robots and Systems (IROS24).
6. S. Jonathan, S. Wana, **M. Choi**, and M. Pryor. “Temporal and Semantic Evaluation Metrics for Foundation Models in Post-Hoc Analysis of Robotic Sub-tasks”. *arXiv preprint (arXiv:2403.17238, under review)*
7. T. T. Walker, J. S. Ide, **M. Choi**, M. Guarino, and K. Alcedo. “Multi-Agent Reinforcement Learning with Epistemic Priors”. 2023 9th International Conference on Control, Decision and Information Technologies (CoDIT23)
8. **M. Choi***, M. Filter*, K. Alcedo, T. T. Walker, D. Rosenbluth, and J. S. Ide. “Soft actor-critic with inhibitory networks for retraining UAV controllers faster”. 2022 International Conference on Unmanned Aircraft Systems (ICUAS22)

EXPERIENCE

Staff Research Engineer

2021 - Present

Lockheed Martin, Austin, TX

- Led and managed \$5M+ research projects (1) Radio Frequency (RF) signal generative modeling (Diffusion, GAN, etc.), (2) advanced mission planning using LLMs and RAG, and (3) multi-agent modeling with multimodal inputs, significantly accelerating internal R&D cycles and informing new high-impact research directions
- Developed mission planning applications using LLMs and RAG, alongside a multimodal, multi-agent system performing high-level planning, dynamic task decomposition, and collaborative task execution across agents and human operators
- Trained a metadata-conditioned, transformer-based RF time-series diffusion model, surpassing spectrogram-based methods by accurately capturing extended temporal patterns and producing higher-fidelity synthetic signals, greatly enhancing downstream RF model performance and reducing costly real-world data dependencies
- Authored multi-million-dollar research proposals as Principal Investigator for the Defense Advanced Research Projects Agency (DARPA), Air Force Research Laboratory (AFRL), and other agencies, focusing on advanced AI topics
- Architected a cognitive system for UAS by integrating a Computer Vision module and Cognitive Signal Processing system; developed RL agents for Man-Unmanned Teaming ISR tasks and designed an in-house distributed RL training engine
- Developed a radar target classification system for automated inference of behaviors and intentions across radar tracks

Graduate Research Assistant

2023 - Present

The University of Texas at Austin, Austin, TX

- Conducted research on neuro-symbolic AI and multimodal reasoning and understanding; trained a large-scale multimodal neural network to develop a neuro-symbolic computer vision system, publishing 6+ papers

AI/ML Solution Architect2019 - 2021

Chief Digital and Artificial Intelligence Office, Washington, D.C.

- Architected and implemented DoD AI/ML infrastructure by designing the foundation for the AI/ML platform, formulating AI/ML Ops strategy with DevSecOps best practices, and developing end-to-end pipelines to automate data engineering and model development across multi-cloud environments (AWS, Azure) for various security levels
- Developed AI/ML applications for critical DoD missions, including predictive maintenance for the US Army and Marine Corps, AI implementation across 5+ mission areas, and a data strategy for the Joint Common Foundation (JCF), while establishing enterprise-wide data governance and secure multi-cloud ingestion pipelines aligned with DoD CIO and CDO strategies

Machine Learning Engineer2018 - 2019

TechField LLC, Atlanta, GA

- Worked with Fortune 500 clients to accomplish a goal of the data pipeline project for the batch or streaming processing and achieved a cost reduction and efficient processing time
- Developed scalable machine learning pipelines, integrating model training, validation, and deployment into existing data infrastructure, thereby accelerating model iteration and enhancing predictive accuracy for client use cases

Data Engineer2017 - 2018

Endpoint Clinical, San Francisco, CA

Data Analyst Intern2016 - 2017

Argus Information and Advisory Services, White Plains, NY

TECHNICAL SKILLS

AI/ML Framework: PyTorch, PyTorch Lightning, TensorFlow, Jax, OpenCV, OpenAI Gym, Ray, GPU acceleration

DevOps & MLOps: AWS, Azure, CI/CD, Airflow, Podman, Docker, Kubernetes (K8s), Kubeflow, MLflow, CUDA

Data Engineering: Hortonworks, Cloudera, RDBMS, NoSQL (Cassandra, HBase, Elasticsearch, DynamoDB, MongoDB), Spark, Kafka, Flink, Flume, MapReduce, Hive, Sqoop, Oozie, NiFi, Kibana

Programming: Python, R, Scala, Java, L^AT_EX

PRESENTATION

[2024] “Towards Neuro-Symbolic Video Understanding” at the 18th European Conference on Computer Vision, Milano, Italy

[2024] “End-To-End Multi-Agent Generative Reward Pipeline (MA-GRPL)” at Lockheed Martin AI Summit, Remote, USA

[2024] “Research Spotlight Presentation” at LG AI Tech Connect, San Francisco, CA

[2023] “Roadmap to Becoming an Artificial Intelligence Researcher” at Korea Polytechnic University, Incheon, S. Korea

[2023] “Incorporating Terrain into Mission Planning using LLM Agents” at Lockheed Martin AI Summit, Remote, USA

[2023] “Deploying Field of View Control RL agent to UAS” at Lockheed Martin AI Summit, Remote, USA

SERVICE

[Reviewing] ICRA (2024), CASE (2024)

[Mentoring] Chungbuk National University (2024)

[Military] US Army Reserve, MOS: 92A (2014–2020)

AWARDS

[2023-2025] Cockrell School of Engineering Fellowship. The University of Texas at Austin

[2024] First Place, General SaaS Section, 4th Ideathon. Primer Sazze Partners