

# HOIN JUNG

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## EDUCATION

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| <b>Purdue University</b><br><i>Ph.D. in Electrical and Computer Engineering</i><br>· Dissertation: Efficient Surgical Interventions for Trustworthy Multimodal Machine Learning Systems | <b>West Lafayette, IN, USA</b><br>Jan. 2023 – Expected May. 2027 |
| <b>Seoul National University</b><br><i>M.S. in Computational Science and Technology</i><br>· Thesis: Local-Ensemble Graph Collaborative Filtering with Spectral Co-Clustering           | <b>Seoul, Korea</b><br>Sep. 2020 – Aug. 2022                     |
| <b>Korea Aerospace University</b><br><i>B.E. in Aerospace &amp; Mechanical Engineering</i><br>· Major of Aircraft System Engineering  | <b>Goyang, Korea</b><br>Mar. 2010 – Feb. 2014                    |

## RESEARCH INTERESTS

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### Trustworthy & Efficient Multimodal Systems

#### Research Context

- Primary Domain: Trustworthy AI, Multimodal Systems, Retrieval-Augmented Generation (RAG)
- Key Problems: Factual Grounding, Fairness & Debiasing, Uncertainty Quantification (UQ), Hallucination

#### Research Methodology

- Core Philosophy: Efficient Post-Hoc Methods without Costly Retraining
- Key Techniques: Causal Inference, Latent Feature & Logit Adjustment, Multimodal Explainability

## WORK EXPERIENCE

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| <b>Los Alamos National Lab (LANL)</b><br><i>Advancing Machine Learning for Scientific Discovery Fellowship (Graduate Internship)</i><br>· Awarded a competitive fellowship to conduct research within the CAI-2 / Computational Physics and Methods Group during the AML Summer School.<br>· Build a temporal-shift reliability benchmark to systematically compare causal neural networks against standard predictive models under tunable rates of distributional drift.<br>· Measure model calibration, coverage, and predictive uncertainty degradation using Uncertainty Quantification (UQ) tools while evaluating feature-importance stability. | <b>Los Alamos, NM, USA</b><br>May 2026 - July 2026    |
| <b>Heterogeneous Integration Design Institute</b><br><i>Research Assistant, Elmore ECE Emerging Frontiers Center</i><br>· Designed an automatic generative designer for multi-band planar antenna<br>· Engineered an explainable model for the ML-based EM simulation via SHAP values  | <b>West Lafayette, IN, USA</b><br>Jan. 2023 – Present |
| <b>Samsung Research America</b><br><i>Research Scientist Intern</i><br>· Conducted research on AI-driven Smart TV solutions in collaboration with senior engineers<br>· Developed an automatic keyboard navigation system using vision-language models (VLMs), specifically optimized for commercial deployment  | <b>Irvine, CA, USA</b><br>May. 2025 – Aug. 2025       |

## Samsung Electronics

Engineer, R&D Team, Department of Digital Appliance

Suwon, Korea  
Aug. 2017 – Aug. 2020

- Developed the thermo-fluid performance of freezing system for brand-new refrigerator
- Analyzed and optimized refrigeration cycle control system to reduce the power usage

## ROK Air Force

Lieutenant, Aircraft Maintenance Officer, The 19<sup>th</sup> Fighter Wings

Chungju, Korea  
Jun. 2014 – May. 2017

- Managed aircraft line maintenance and administered ground safety department for the military base

## PUBLICATIONS

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1. **H.Jung**, S.Lu, D.Wang, and X.Wang, “Assessing the Reliability of Image Quality Metrics and Mitigating Quality Bias in Generative Models”, *Conference on Computer Vision and Pattern Recognition (CVPR)*, Findings, 2026.
2. **H.Jung**, V.Nascimento, H.Liu, X.Wang, C.K.Koh, and D.Jiao, “Generative Antenna Design with Accuracy, Diversity, and Explainability via Dynamic Pseudo-Labeling”, *IEEE Journal on Multiscale and Multiphysics Computational Techniques (JMMCT)*, 2026.
3. **H.Jung**, J.Chai, and X.Wang, “Adaptive Logit Adjustment for Debiasing Multimodal Language Models”, *International Conference on Learning Representations (ICLR)*, 2026.
4. **H.Jung**, J.Liu, A.Rao, X.Zhao, A.Chandra, and M.Sarkis, “TVAgent: A lightweight Vision-Language-Model for TV GUI Agent”, *AAAI Workshop on Deployable AI (DAI)*, 2026.
5. T.Jang, **H.Jung**, and X.Wang, “Target Bias Is All You Need: Zero-Shot Debiasing of Vision-Language Models with Bias Corpus”, *International Conference on Computer Vision (ICCV)*, 2025.
6. **H.Jung**, J.Chai, and X.Wang, “Adversarial Latent Feature Augmentation for Fairness”, *International Conference on Learning Representations (ICLR)*, 2025.
7. H.Lee, **H.Jung**, and S.Bae, “Framing Korea: the role of international student YouTubers in shaping destination perceptions”, *Current Issues in Tourism*, 2025.
8. **H.Jung** and X.Wang, “Towards On-the-Fly Novel Category Discovery in Dynamic Long-Tailed Distributions”, *Winter Conference on Applications of Computer Vision (WACV)*, 2025.
9. **H.Jung** and X.Wang, “Fairness-Aware Online Positive-Unlabeled Learning”, *Empirical Methods in Natural Language Processing (EMNLP)*, Industry Track, 2024.
10. **H.Jung**, T.Jang, and X.Wang, “A Unified Debiasing for Vision-Language Model across Modalities and Tasks”, *Neural Information Processing Systems (NeurIPS)*, 2024. (**Spotlight**)
11. **H.Jung**, V.Nascimento, H.Liu, X.Wang, C.K.Koh, and D.Jiao, “Explainable Planar Multiband Antenna Designer with Wasserstein Generative Adversarial Network”, *IEEE International Symposium on Antennas and Propagation (AP-S)*, 2024. (**Oral Presentation**)
12. **H.Jung**, H.S.Choi, and M.Kang, “Boundary Enhancement Semantic Segmentation for Building Extraction From Remote Sensed Image”, *IEEE Transactions on Geoscience and Remote Sensing (TGRS)*, 2021.

## PAPERS UNDER REVIEW

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1. **H.Jung**, R.Zhang, and X.Wang, “Fine-grained Retrieval-Augmented Generation via Plug-and-Play Sparse Encoder”, *Empirical Methods in Natural Language Processing (EMNLP)*, 2026.
2. **H.Jung**, and X.Wang, “The Cost of Context: Mitigating Textual Bias in Multimodal Retrieval-Augmented Generation”, *Neural Information Processing Systems (NeurIPS)*, 2026.
3. S.Lu, **H.Jung**, Z.Fang, and X.Wang, “Fair Diffusion Sampling without Demographics”, *Neural Information Processing Systems (NeurIPS)*, 2026.

4. **H.Jung**, H.Liu, K.Chao, X.Wang, C.K.Koh, and D.Jiao, “Uncertainty-Aware S-Parameter Estimation of Chiplet Interconnects via Conformalized Quantile Regression”, *International Conference on Computer-Aided Design (ICCAD)*, 2026.
5. X.Liu, R.Zhang, W.Yu, S.Xiong, H.Liu, F.Wu, **H.Jung**, M.Fredrikson, X.Wang, and J.Gao, “The Vision Wormhole: Latent-space Communication in Heterogeneous Multi-Agent System”, *Conference on Language Modeling (COLM)*, 2026.
6. **H.Jung**, and X.Wang, “Beyond Chunking: Efficient Global Pooling for Holistic Long-Document Representation”, *Conference on Knowledge Discovery and Data Mining (KDD)*, 2026.
7. C.Han, Y.Sim, **H.Jung**, J.Lee, H.Lee, YS.Kang, S.Woo, G.Kim, HW.Park, and M.Jun, “IMPACT: Industrial Machine Perception via Acoustic Cognitive Transformer”, *Conference on Knowledge Discovery and Data Mining (KDD)*, 2026.
8. J.Chai, **H.Jung**, and X.Wang, “Enhancing Semantic Consistency in Debaised Text-to-Image Generations: A Prompt Engineering Approach”, *International Conference on Machine Learning (ICML)*, 2026.

## AWARDS AND SCHOLARSHIP

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Advancing Machine Learning for Scientific Discovery Fellowship <i>Los Alamos National Laboratory</i>	Summer 2026
<ul style="list-style-type: none"> <li>• Awarded to select graduate researchers to develop trustworthy and transparent machine learning methodologies for critical scientific applications.</li> </ul>	
Bilsland Dissertation Fellowship <i>Purdue University</i>	Spring 2027
<ul style="list-style-type: none"> <li>• Awarded to outstanding Ph.D. candidates to support final dissertation completion.</li> </ul>	
CVPR 2025 Outstanding Reviewers (Top 5%)	Jun. 2025
Purdue Graduate Student Government Travel Grant	Nov. 2024
NeurIPS 2024 Scholar Award	Oct. 2024
NeurIPS 2024 Spotlight Paper (Top 2.5%)	Oct. 2024
Future Industry Talent Graduate Scholarship <i>Hyundai Motor Chung Mong-Koo Foundation</i>	Fall 2021 – Spring 2022
National S&T (Science & Technology) Scholarship <i>Korea Student Aid Foundation</i>	Fall 2010

## ACADEMIC SERVICE

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### Conference Reviewing & Program Committees

- Area Chair: IEEE ICASSP (2026)
- Program Committee: AAAI (2024, 2025, 2026), IEEE BigData (2025)
- Reviewer: ICLR (2026), CVPR (2025, 2026), WACV (2026), NeurIPS (2025, 2026), SafeMM-AI Workshop (ICCV 2025), ECCV (2024), KDD (2024, 2026)

### Journal Reviewing

- IEEE Journal on Multiscale and Multiphysics Computational Techniques (JMMCT)
- Transactions on Machine Learning Research (TMLR)
- IEEE Transactions on Geoscience and Remote Sensing (TGRS)

### University Service

- Grant Review and Allocation Committee, Purdue Graduate Student Government

## LEADERSHIP

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- Mentor**, Purdue ECE G-LaMP (Graduate Leadership and Mentorship Program) (2025-2026)  
**Co-Chair**, ICON Student Research Conference, Purdue University (2026)  
**Vice President**, Students Government, Korea Aerospace University (2013)

## PRESENTATIONS

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1. “Adaptive Logit Adjustment for Debiasing Multimodal Language Models” Mar. 2025  
*Poster, Purdue ECE Open House Symposium*
2. “A Unified Debiasing Approach for Vision-Language Models across Modalities and Tasks” Dec. 2024  
*Spotlight Poster, Neural Information Processing Systems (NeurIPS 2024)*
3. “An Efficient and Unified Debiasing Approach for Vision-Language Models across Modalities and Tasks” Jul. 2024  
*Lightning Talk, Fast Machine Learning for Science Conference 2024*
4. “Explainable Planar Multiband Antenna Designer with Wasserstein Generative Adversarial Network” Jul. 2024  
*Oral, 2024 IEEE International Symposium on Antennas and Propagation*
5. “Boundary Improvement Module for Binary Semantic Segmentation in Remote Sensing” Jun. 2021  
*Oral, Korean Society for Industrial and Applied Mathematics (KSIAM)*
6. “Segmentation model for tracking building in satellite imagery” Nov. 2020  
*Poster, Korean Society for Industrial and Applied Mathematics (KSIAM)*

## TEACHING EXPERIENCE

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- ECE 695 Machine Learning in Bioinformatics and Healthcare** Purdue University, West Lafayette, IN  
*Guest Lecture* Fall 2025  
· Designed and delivered a lecture on “Post-Training and Inference-Time Approaches for ML in Healthcare,” introducing advanced efficiency techniques to graduate students.
- ECE 570 Artificial Intelligence** Purdue University, West Lafayette, IN  
*Teaching Assistant, Electrical & Computer Engineering* Fall 2024, Spring 2025, Spring 2026  
· Held office hours and led student projects across three course sections, serving a total of 804 students
- Computer Literacy & Programming (Python)** Seoul National University, Seoul, Korea  
*Instructor, Language Education Institute* Mar. 2021 – Jul. 2022  
· Designed and delivered a Python programming course for beginner-level students for three semesters
- L0444: Basic Computing (Python)** Seoul National University, Seoul, Korea  
*Teaching Assistant, Faculty of Liberal Education* Spring 2021, Spring 2022  
· Led weekly lab sessions for 50+ students each semester