

Applied Imagery Pattern Recognition Workshop (AIPR 2026)
George Washington University — Science & Engineering Hall (SEH)
800 22nd St. NW, Washington, DC www.aipr-workshop.org

DAY 1 — Monday, October 12
Digital Twins · Medical Imaging · Synthetic Vision ·

Industrial Vision

8:00 AM **Registration & Morning Coffee/Breakfast**

9:00 – 9:10 AM **Introductory Remarks** Program Chair

9:10 – 10:10 AM

Invited Speaker — Evan Gibson, Soresu

SESSION 1: Digital Twins & Industrial AI

10:10 – 10:30 AM

A Digital Twin Data Engine for HVAC Sensor-Fault Detection and Classification with Data-Driven Shadow Models, Das, A.; Challa, K.; Singh, R.; Gokaraju, B.

10:30 – 10:50 AM

Physics-Guided Sparse Identification of Spatiotemporal Thermal Dynamics for HVAC Digital Twins, Das, A.; Kosaraju, V.; Challa, K.; Alhmoud, I.; Eshun, R.; Gokaraju, B.

10:50 – 11:10 AM Morning Break (20 min)

11:10 – 11:30 AM

Rescuing Perishable Process Data: Multimodal LLM Extraction from Fourteen Years of Handwritten Cleanroom Logbooks for Digital Twin Grounding, Brock, M.; Das, A.; Kosaraju, V.; Kollipara, Y.; Challa, K.; Eshun, R.; Gokaraju, B.; Aravamudhan, S.; Rizal, B.

11:30 – 11:50 AM

Scan-to-Twin: An End-to-End Pipeline for Building Training-Ready Digital Twins of Legacy Manufacturing Equipment, Brock, M.; Kollipara, Y.; Challa, K.; Eshun, R.; Gokaraju, B.; Aravamudhan, S.

11:50 AM – 1:00 PM Lunch (1 hr 10 min)

1:00 – 2:00 PM

Invited Speaker — Deepfake Detection Demo — Ghulam Mujtaba, Regis University

SESSION 2: Medical Imaging & Biomedical AI
2026

Day 1, Monday, Oct. 12,

2:00 – 2:20 PM

Diffusion Model-Based Medical Chest X-Ray Image Generation: A Modern Approach, Chandrappa, S.

2:20 – 2:40 PM

Evolutionary Non-Linear Feature Extraction for Temporal Grounding of Medical Large Language Model Output, Mankala, C., Silva, R.

2:40 – 3:00 PM

Assessing the Potential of Machine Learning for Predicting Tuberculosis Treatment Outcome in a Multi-Country Cohort in Southern Africa, Cid, V.; Bui, V.; Kantipudi, K.; Yaniv, Z.; Jaeger, S.

3:00 – 3:20 PM *Learnable Wavelet Filters for Noise-Robust CT Reconstruction*, Maram, R.; Loew, M.; Levy, E.

3:20 – 3:40 PM Afternoon Break (20 min)

SESSION 3: Synthetic Vision & Scene Understanding

3:40 – 4:00 PM

Sharper but Less Truthful: Evaluating Generative Super-Resolution as a Source of Vision–Language Model Error, Zarei, M.

4:00 – 4:20 PM

Mask Fusion-trace (MFt): Generating Smooth Transitional Synthetic Data for Segmentation Analysis and Metric Evaluation, Guan, S.

4:20 – 4:40 PM

Label-Efficient Dark-Vessel Detection in SAR: Does SAR-Domain Pretraining Outperform Optical and ImageNet Transfer Across ViT and CNN, Roth, J.; Wagner, K.; d'Aliberti, L.

SESSION 4: Industrial & Computer Vision

Day 1, Monday, Oct. 12,

2026

4:40 – 5:00 PM

Toward Conditional Autonomy on an Embedded Scaled Vehicle: Fusing Task-Specific CNNs and Open-Vocabulary Foundation Models, Tang, A.; Kari, S.; Nenebi, C.; Dantuluri, D.; Eshun, R.; Alhmoud, I.; Liang, C.L.; Gokaraju, B.

5:00 – 5:20 PM

The Church-Shaped Synagogue, Brander, Y.

POSTER SESSION — 5:30 – 7:30 PM

All posters displayed simultaneously. Authors present throughout.

- *Deep Transfer Learning using Triplet Loss for Reducing Healthcare Disparities arising from Biomedical Data*, Kumar Das, B.; Madamanchi, C.; Sharma, T.
- *Enhanced RetinaNet with BiFPN, Attention Mechanisms, and Fine-Scale Feature Fusion for Infrared Object Detection*, Amankwah, A.
- *Distributed SAR Processing on SWIFT-A*, Gibson, E.
- *Label-Efficient Dark-Vessel Detection in SAR: Does SAR-Domain Pretraining Outperform Optical and ImageNet Transfer Across ViT and CNN*, Roth, J.; Wagner, K.; d'Aliberti, L.
- *Vision-Based Autonomous Steering for Ground Vehicles: A Comparative Study of CNN Classification, Deep CNN Regression, and Vision Transformers*, Nenebi, C.; Tang, A.; Dantuluri, D.; Kari, S.; Eshun, R.; Alhmoud, I.; Gokaraju, B.
- *Evaluating Side-Camera Lane Tracking and Deep Learning Traffic Light Detection on a Custom Ground Vehicle: A Decoupled Approach Combining Geometric Vision, Deep Learning, and RGB-D Proximity Mapping*, Malyala, S.; Dantuluri, D.; Gokaraju, B.; Eshun, R.; Alhmoud, I.
- *Autonomous Generation of Semantic Occupancy Grids via Monocular Vision and Lidar Fusion for Low-Cost Autonomous Vehicles*, Tang, A.; Kari, S.; Nenebi, C.; Dantuluri, D.; Eshun, R.; Alhmoud, I.; Liang, C.L.; Gokaraju, B.
- *A Unity-Based Digital Twin with Projector-Driven Dynamic Environments for Vision-Only Autonomous Navigation*, Kosaraju, V.; Sekyema, J.; Das, A.; Brock, M.; Challa, K.; Eshun, R.; Alhmoud, I.; Gokaraju, B.
- *Uncertainty-Aware RGB-D Visual-Inertial Localization for a Low-Cost Ground Robot Under Sensor Degradation*, Dantuluri, D.; Malyala, S.; Kari, S.; Tang, A.
- *Rig360: A Rig-Constrained Structure-from-Motion Pipeline for Failure-Free, Metric-Scale 3D Gaussian Splatting Reconstruction*, Borse, R.; Patel, D.; Dave, S.; Pore, S.
- *Toward Robotics Simulation: Native Spherical Harmonics Shading for Mesh-Splatting Assets in Open-Source Renderers*, Borse, R.; Mehla, S.; Patel, D.; Dave, D.; Dave, S.
- *Real Time Pixel Level Esports Prediction Using Edge AI*, Gregory, T.; Mujtaba, G.
- *Dynamic Attention Based Late Fusion for Binary Flood Classification on Social Media*, Nguyen, Q.

- *Quantum Walk-Based Analysis of Retinal Vascular Graphs*, Attari, M.; Bunyak, F.
- *Implementing Agentic AI in Virtual Reality: A Framework for RAG-Driven Autonomous Instruction in Poultry Science*, Pendem, A.; Alhmoud, I.; Gokaraju, B.; Lyi, L.
- *A 2D–3D Spatial Measurement Framework for Indoor Accessibility Assessment*, Shih, H.; Bunyak, F.
- *Raman Spectroscopy of Analog Minerals for Enhanced Lunar Science and Exploration*, Hare, L.
- *Brain Atlases Improve Diagnosis of Alzheimer's Disease Using Persistent Homology* Mukherjee, S.; Loew, M.
- *Knowing When to Escalate – Adaptive Specialist-Generalist Routing for Open-World Object Detection*, Kakaraparty, S.
- *From Interoperability to Explainability: Reimagining the Role of Standards in the Age of Agentic AI*, H. Jim Antonisse; Steven A. Israel
- *A Standards Architecture for Interoperable GeoAI: A Framework for Training Data, Inference Models, and Performance Evaluation*, H. Jim Antonisse; Steven A. Israel
- *Global to Local Dairy Cow Re-Identification via Selective Geometric Verification*, Halah Shehada, Dong Ha, Sook Shin
- *Objective Measures of Scene Complexity Inform Performance of Machine Learning Object Detectors*, Irvine, J.; Irizarry, N.; Njeunje, F.; Vilt, S.
- *Integrated Face–Torso Framework for Comparing Torso Texture, Color, and Texture–Color Fusion in SVM-Based Person Re-Identification Across Non-Overlapping Cameras*, Carrillo-Medina, J. L.; Ivone Arias Almeida, I.; Otañez, E.; Molina, E.
- *When One Pixel Tips the Scale: The Geometric Instability of IoU-Thresholded Metrics for Small Object Detection: The Geometric Instability of IoU-Thresholded Metrics for Small Object Detection*, Christopher Algire, C.; Israel, S.; Irvine, J.; Kalukin, A.; Palaniappan, K.
- *GeoFoundation Model-Driven Semantic Segmentation of Wildfires: Semantic Segmentation*, Penmatsa, E.; Pillalamarri, K.; Vatsavai, R.

DAY 2 — Tuesday, October 13

Robotics · Autonomous Vehicles · Geospatial Sensing ·

Vision-Language Models

8:00 AM

Morning Coffee and Breakfast

9:00 – 9:10 AM

Introductory Remarks Program Chair

9:10 – 10:10 AM

Invited Speaker — The AI Revolution in Multimodal Radiology Informatics —

Ron Summers, MD, PhD — NIH Clinical Center

SESSION 5: Robotics Simulation & 3D Reconstruction

10:10 – 10:30 AM

Reality-Anchored Simulation for Scalable Synthetic Data Generation in Robust Perception Training, Borse, R.; Patel, D.; Dave, D.; Dave, S.

10:30 – 10:50 AM

A Comparative Review of Open-Source Models for 3D Mesh Reconstruction and PBR Texturing Borse, R.; Patel, D.; Patil, R.; Dave, D.; Dave, S.; Pore, S.

10:50 – 11:10 AM Morning Break (20 min)

11:10 – 11:30 AM

TBD

11:30 – 11:50 AM

Egocentric-to-Synthetic: A Multi-Model Cosmos Pipeline for Generating Household-Task Training Data for Robots, Jha, S.; Saucedo, S.; Tanner, F.

11:50 AM – 1:00 PM Lunch (1 hr 10 min)

1:00 – 2:00 PM

Invited Speaker — Geospatial Applications of AI: Mapping Intelligence at Scale —
Todd Johanesen, NGA

SESSION 6: Vision-Language Models & Evaluation **Day 2, Tuesday, Oct. 12, 2026**

2:00 – 2:20 PM

Reference-free Video Caption Evaluation Using Vision Language Model, Rachakonda, N.; Awad, G.

2:20 – 2:40 PM

The Primary Differences Between a LLM and SLM, Cerkez, P.

2:40 – 3:00 PM

Implementing Agentic AI in Virtual Reality: A Framework for RAG-Driven Autonomous Instruction in Poultry Science, Pendem, A.; Alhmoud, I.; Gokaraju, B.; Lyi, L.

3:00 – 3:20 PM Afternoon Break (20 min)

SESSION 7: Geospatial, Atmospheric & Remote Sensing

3:20 – 3:40 PM

A Configuration-Driven Application for Atmospheric Trace Gas Mapping, Pattern Recognition, and Comparative Geospatial Review, Kemal, M.; DeCarlo, P.; Rodriguez, P.; Nault, B.; Madrigano, J.; Miles, M.

3:40 – 4:00 PM

TBD

4:00 – 4:20 PM

Automated Evaluation Framework for Training Remote Sensing Foundation Models, Sarkar, S.; Cabrera, H.; Mace, E.; Wickrema, C.; Lape, N.; Kotamraju, S.

4:20 – 4:40 PM

Pale Blue Dot on a Dime: Compute-Efficient Foundation Model Pretraining for Remote Sensing, Wickrema, C.; Mace, E.; Cabrera, H.; Sarkar, S.; Lape, N.; Kotamraju, S.; Hughes, E.; Zarrella, G.

4:40 – 5:00 PM

DCFormerNet: Dark Channel Guided Transformer based Network for Single-Image Dehazing, Goswami, S.; Agarwal, N.; Sharma, T.

CLOSING & AWARDS — 5:00 – 5:30 PM

Day 2, Tuesday, Oct.

12, 2026

Best Student Paper Award Announcement

Conference Closing by Program Chair