Andres Ramirez-Jaime

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Summary

Ph.D. candidate in Electrical and Computer Engineering specializing in machine learning, generative models, and large language models for remote sensing and computer vision, with a focus on diffusion models for imaging inverse problems (e.g., super-resolution, denoising, and reconstruction). Proven experience at Apple and Vertex delivering production-grade LLM and computer vision systems, including RAG pipelines, LoRA-based fine-tuning, and medical image segmentation. Track record of leading cross-functional research with NASA and industry partners, publishing in top IEEE venues, and mentoring junior researchers. Actively seeking Machine Learning / Applied Scientist / Research Scientist roles.

Technical Skills

- **Programming & Scripting**: Python, C, MATLAB, LabVIEW
- **ML & Deep Learning**: PyTorch, TensorFlow, Keras, GANs, Diffusion Models, Transformers, LLMs, multimodal neural networks
- **Domains**: Computer vision, large language models, remote sensing, LiDAR, hyperspectral imaging, biomedical signal processing, robotics
- **Tools & Platforms**: Linux, Git, GIS, LaTeX

Experience

Apple Inc. Cupertino, CA, USA
Large Language Models and Generative AI Engineering Intern *Summer 2024*

- Developed and implemented a retrieval-augmented generation (RAG) system to enhance metadata for internal tools, improving in-context learning and performance of Apple Intelligence LLMs.
- Fine-tuned Apple Intelligence LLMs for iPhone-specific use cases by curating task-focused datasets and applying LoRA adapters for efficient parameter-efficient fine-tuning.
- Designed and maintained evaluation datasets and hand-crafted test suites targeting edge cases and complex queries to rigorously stress-test model behavior.
- Created and optimized the LLM testing pipeline, increasing the iteration rate from 1 to over 4 training/evaluation cycles per day, accelerating experimentation and deployment.
- Analyzed hallucination patterns in Apple Intelligence, contributing to mitigation strategies that improved reliability and user trust in model outputs.

Vertex Pharmaceuticals San Diego, CA, USA
Computer Vision and Machine Learning Engineer *Summer 2023*

- Contributed to early drug discovery projects for pulmonary fibrosis (IPF) and polycystic kidney disease (ADPKD) in close collaboration with biologists, physicians, and chemists.
- Built a U-Net-based semantic segmentation model for medical gigapixel images achieving over 90% accuracy, helping histopathologists assess compound efficacy for pulmonary fibrosis.
- Developed an automatic computer vision pipeline to segment kidney organoids in whole slide images and estimate physiological properties (size, wall thickness) with errors below 3%.

University of Delaware Newark, DE, USA
Research and Teaching Assistant *Feb 2022 – Present*

- Conduct research on machine learning for LiDAR and hyperspectral data using Transformers, Diffusion Models, GANs, and multimodal neural networks as part of the NASA CASALS project.
- Developed algorithms to enhance the accuracy and resolution of LiDAR and hyperspectral analysis, achieving satellite height estimation errors of less than 1 m.
- Co-authored multiple peer-reviewed papers and presented work at international conferences on remote sensing and computational imaging.
- Collaborated with interdisciplinary teams (ecology, physics, engineering) and implemented ML pipelines in Python and MATLAB for large-scale data processing.

- Mentored two Ph.D. students, one master's student, and several visiting researchers; served as TA for Statistical Learning, Imaging and Deep Learning, and Probability/Statistics courses.

University of Delaware Newark, DE, USA
Visiting Scholar *Jul 2021 – Dec 2021*

- Designed the HyperHeight Data Cube (HHDC) representation for efficient storage and processing of compressed 3D satellite LiDAR data.
- Implemented a 3D convolutional autoencoder to reconstruct compressed HHDCs, significantly improving reconstruction accuracy and efficiency for remote sensing workflows.

University of La Sabana Chia, Colombia
Mechanical Engineering Professor *Jan 2018 – Dec 2021*

- Taught in the Department of Prototypes and Manufacturing (Mechanical Engineering) and supervised 12 undergraduate thesis projects.
- Designed and programmed the embedded system for the UNISABANA Herons mechanical ventilator used in intensive care units for COVID-19 patients across Colombia.
- Automated respiratory control and data collection using C and LabVIEW, and built analysis tools that supported regulatory approval by the Colombian FDA.
- Led the university robotics group; developed embedded Linux applications and ML-based perception to recognize the soccer ball and referee whistle in real time for RoboCup competitions, achieving runner-up in category.

Education

University of Delaware Newark, DE, USA
Ph.D. in Electrical and Computer Engineering *July 2026*

- GPA: 3.92; 2022 George W. Laird Fellow; 2024 ECE Signal Processing Award; 2024 Doctoral Fellowship for Excellence.

University of Los Andes Bogotá, Colombia
Master in Computer and Electronic Engineering *March 2016*

- Graduated *Cum Laude*.

University of Los Andes Bogotá, Colombia
Bachelor in Electronic Engineering *October 2013*

Selected Publications

- **Super-Resolved 3D Satellite LiDAR Imaging of Earth Via Generative Diffusion Models**. Ramirez-Jaime, A. et al., submitted to *IEEE Trans. Geoscience and Remote Sensing*, 2024.
- **Super-Resolution of Satellite Lidars for Forest Studies Via Generative Adversarial Networks**. Ramirez-Jaime, A. et al., IGARSS 2024, IEEE, 2024.
- **Super-Resolution of Satellite Lidars for Forest Studies Using Diffusion Generative Models**. Ramirez-Jaime, A. et al., 2024 IEEE Conference on Computational Imaging Using Synthetic Apertures (CISA), 2024.
- **Transformer End-to-End Optimization of Compressive Lidars Using Imaging Spectroscopy Side-Information**. Porras-Diaz, N., Ramirez-Jaime, A. et al., *IEEE Trans. Geoscience and Remote Sensing*, vol. 62, 2024.
- **HyperHeight LiDAR Compressive Sampling and Machine Learning Reconstruction**. Ramirez-Jaime, A. et al., *IEEE Trans. Geoscience and Remote Sensing*, vol. 62, 2024.

Leadership & Service

- Board Member, Hispanic/Latino Graduate Student Association (2021–2023).
- Board Member, SACNAS – Society for Advancement of Chicanos/Hispanics and Native Americans in Science (2023–2024).
- First Point of Contact, University of Delaware Summer Research Program (2021–2023).
- International Volunteer, World Youth Day (2019); Volunteer Staff, Opus Dei (2018–2021).