Edwin Vargas
Postdoctoral Researcher – Computational Imaging & Computer Vision
Houston, TX | edwin.vargas@rice.edu | Google scholar | Linkedin

Professional Summary

Research Scientist with over 7 years of academic and applied experience in Computational Imaging (CI), Signal Processing (SP), and Deep Learning (DL). My expertise lies in solving complex, multidisciplinary problems by integrating DL, mathematical theory, and physics models. As a Postdoctoral Researcher at Rice University, I lead projects on trustworthy image authentication for AI systems and high-resolution radar imaging. My Ph.D. research delivered high-impact solutions, including the design of a CI system for spectral-depth imaging, a novel dual-blind deconvolution algorithm for joint radar-communications systems, and the development of high-performance DL for edge devices. I am passionate about translating theoretical insights into real-world systems.

Professional Experience

Rice University – Postdoctoral Researcher
Houston, TX, United States | 2023–Present

- Designing specialized computational imaging systems that capture authentic images and developing a new deep learning model robust to adversarial forgeries.
- Leading the development of next-generation sensing systems for “vision-enabled” communication by integrating deep learning with signal processing.

Universidad Industrial de Santander – Doctor of Philosophy in Electrical Engineering
Bucaramanga, Colombia | 2019-2023

- Conducted advanced, multidisciplinary research at the intersection of computational imaging, machine learning, and signal processing.
- Designed a computational imaging system for spectral-depth imaging and developed a framework for high-performance deep learning models tailored for resource-constrained edge devices (e.g., mobile phones).
- Pioneered a novel dual-blind deconvolution algorithm for joint radar-communications systems, enabling effective signal separation and improving system performance.

Universidad Industrial de Santander – Specialist Professional-Ecopetrol
Bucaramanga, Colombia | 2019-2021

- Designed innovative seismic acquisition technologies for exploration in the oil and gas sector using compressive sensing techniques.

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- Development of optimization algorithms for seismic data acquisition, sensing, and processing. Conducted under the cooperation agreement between UIS and ICP/Ecopetrol.

Stanford University – Internship
Stanford, CA, United States | 2020-2021

- Developed time-multiplexed coded aperture (TMCA) systems for compressive light field and hyperspectral imaging by using end-to-end optimization of coded snapshots and computational decoder. Improved image quality while using 5% to 10% of the data. Under the supervision of Dr. Gordon Wetzstein.

Education

Ph.D. in Electrical Engineering, Universidad Industrial de Santander, Colombia – 2023
M.Sc. in Electrical Engineering, Universidad Industrial de Santander, Colombia – 2018
B.Sc., Electrical Engineering, Universidad Industrial de Santander, Colombia – 2016

Technical Skills

- Programming & Frameworks: Python, PyTorch, TensorFlow, MATLAB, C++, Git, Linux.
- Machine Learning: Deep learning, image segmentation, pruning, quantization.
- Signal & Image Processing: Compressive sensing, convex/non-convex optimization, 3D reconstruction, integrated sensing and communications.
- Applications: Vision-enabled communication, integrated sensing and communications, seismic imaging, satellite analysis, document recognition, compressive sensing.

Top Publications

1. BiPer: Binary neural networks using a periodic function – Conference: Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2024
2. Coordinate-based seismic interpolation in irregular land survey: A deep internal learning approach – Journal: IEEE Transactions on Geoscience and Remote Sensing, 2023
3. Dual-blind deconvolution for overlaid radar-communications systems – Journal: IEEE Journal on Selected Areas in Information Theory, 2023
4. Time-multiplexed coded aperture imaging: Learned coded aperture and pixel exposures for compressive imaging systems – Conference: Proceedings of the IEEE/CVF International Conference on Computer Vision, 2021
5. *Spectral image fusion from compressive measurements using spectral unmixing and a sparse representation of abundance maps* – Journal: IEEE Transactions on Geoscience and Remote Sensing, 2019

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Awards & Honors

- Rice Academy Postdoctoral Fellowship, Rice University – 2024 (https://riceacademy.rice.edu/junior-fellows/dr-edwin-vargas)
- Thesis Laureate: Awarded the highest academic honor for my Ph.D. thesis at Universidad Industrial de Santander, recognizing exceptional research and a significant contribution to the field of Electrical Engineering.
- Internship – Computational Imaging Lab, Stanford University – 2020
- Graduated Cum Laude – B.Sc. in Electrical Engineering, Universidad Industrial de Santander – 2016

Languages

- English: Professional fluency
- Spanish: Native proficiency