

# Leron Julian

[LeronJulian.github.io](https://LeronJulian.github.io) | [LeronJulian@hotmail.com](mailto:LeronJulian@hotmail.com) | 321-948-8779

## INTERESTS

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Artificial Intelligence: Computer Vision, Machine Learning, Generative AI/LLM

## EDUCATION

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2019 - 2024 **Carnegie Mellon University**

Doctor of Philosophy (Ph.D.) in **Electrical & Computer Engineering**

Advisor: Aswin Sankaranarayanan

Thesis: Computational Imaging For Long-Term Solar Irradiance Forecasting

2015 - 2019 **Morehouse College**

Bachelor of Science (B.S.) in **Computer Science**

## EXPERIENCE

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**Carnegie Mellon University**, *Research Assistant*

August 2019 - August 2024

- Engineered machine learning models (Transformers, CNNs, LSTMs) for spatial forecasting of images and time-series numerical values.
- Leveraged state-of-the-art advances in computational imaging and computer vision (optical flow, image generation and scene understanding) for enhanced inference accuracy.
- Built large-scale datasets used in full life-cycle of the machine learning pipeline, ensuring efficient model training, testing, and deployment.

**Samsung Research America**, *Computer Vision Research Intern*

June 2023 - August 2023

- Designed a real-time 3D reconstruction algorithm from monocular input views that leverages Neural Radiance Fields (NeRF) to enable immersive telepresence experiences.

**Idaho National Laboratory**, *Data Analyst Intern*

June 2019 - August 2019

- Developed machine learning models for predictive maintenance using semi-supervised data to improve real-time asset management in nuclear power plants.

**NBCUniversal**, *Software Engineer Intern*

June 2018 - August 2018

- Contributed to full-stack architecture modernization including GraphQL and JavaScript frameworks.

## SKILLS

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**Programming:** Python (9+ years), C++ (9+ years), MATLAB (5+ years), Java, HTML/CSS.

**Frameworks:** PyTorch (5+ years), Tensorflow, OpenCV, HuggingFace, SciPy, Scikit-learn, Pandas.

**Tools:** Git/Github, Linux, CUDA, Blender.

**ML/NLP Techniques:** Transformers, LLM Fine-tuning (SFT), Generative Models, Distributed Training.

## PUBLICATIONS

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- **Julian, Leron**, Haejoon Lee, et al. “Computational Imaging for Long-Term Prediction of Solar Irradiance”. In: *Under Review In IEEE Trans. Pattern Analysis and Machine Intelligence (TPAMI)/Special Issue of ICCP*, 2024.
- **Julian, Leron** and Aswin C. Sankaranarayanan. “Precise Forecasting of Sky Images Using Spatial Warping”. In: *International Conference on Computer Vision (ICCV) Workshop on Physics-based Vision meets Deep Learning*, 2021.
- **Julian, Leron** et al. “The Development of a Conversational Agent Mentor Interface Using Short Message Service (SMS)”. In: *Proceedings of the 2018 ACM SIGMIS Conference on Computers and People Research. Association for Computing Machinery*, 2018.

## PROJECTS

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### Visual Grounding and Scene Description using Large-Language Model (LLM)

- Conducted research, leveraging the RefCOCO dataset, to enable precise object localization and region-specific textual descriptions in a multi-modal (LLM/Vision) systems

### Enhanced Interaction Using Eye-Tracking For Virtual Reality Scene

- Improved interactions between users and objects within virtual and mixed-reality scenes using eye-tracking and the Meta Quest Pro headset.
- Developed using Unity and C# programming language.

### Dynamic Graphs For Point Cloud Completion

- Improved point cloud completion (inpainting) using a Dynamic Graphs.
- Added k-NN dynamic graphs into the learning pipeline as a prior to model the overall structure of the input, resulting in a more accurate reconstructed point cloud.
- Implemented using PyTorch and PyTorch3D.

### Novel View Synthesis of Transparent Objects using NeRF

- Improved traditional Neural Radiance Fields (NeRF) for novel view synthesis of transparent objects using shape from distortion and shape refinement.

### Semi-Supervised Learning For Image Classification

- Investigated the effects that traditional regularization and consistency regularization methods had on performance of the self-training semi-supervised learning (SSL)

## TEACHING EXPERIENCE

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- **Machine Learning For Engineers (18-661)** *Teaching Assistant for graduate course of 80 students.*
- **Programming 2: C++ (CSC160)** *Teaching Assistant for undergraduate course of 20 students.*
- **Python and Computer Vision** *Teaching Assistant for undergraduate course of 15 students.*

## COURSEWORK

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Intro to XR systems

Learning Based 3D Computer Vision

Computational Photography

Estimation, Detection & Learning

Intermediate Optics

Geometry-Based Vision

Machine Learning

Image & Video Processing

Sports Technology

Computer Vision

Convex Optimization