Emmanuel A. Larralde-Ortiz

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Education

Centro de Investigación en Matemáticas — Guanajuato City, Mexico
Master of Science in Computer Science — *Aug. 2024 – June 2026*

- **Relevant Coursework:** Statistical Learning, Computer Vision, Machine Learning, Motion Planning, Deep Generative Modeling.

Instituto Politécnico Nacional — Mexico City, Mexico
Bachelor of Engineering in Mechatronics Engineering — *Aug. 2017 – Dec. 2022*

Experience

CPU Design Verification Engineer — Feb. 2023 – July 2024
Intel Corporation — *Zapopan, Mexico*

- Collaborated on developing Intel's leading single-thread performance CPU microarchitecture, focusing on a high-performance Branch Prediction Unit (BPU).
- Developed a cycle-accurate reference model for the BPU, predominantly using Python, integrated with SystemVerilog and C++.
- Modeled from bottom-up an enhanced version of Intel's Return Stack Buffer.
- Contributed to CI/CD with GitHub Actions to improve integration and testing efficiency.

Graduate Technical Intern — Jan. 2022 – Jan. 2023
Intel Corporation — *Zapopan, Mexico*

- Contributed to the design verification of a video compression controller (H.264, AV1, JPEG) for Intel Xeon Granite Rapids-D processors, tailored for Edge applications.
- Ensured pre-Silicon design accuracy through functional testing and code coverage using SystemVerilog, Python, and Perl.

Projects

DonkieTown | *Python, C++, ROS, OpenCV* | github.com/L4rralde/DonkieTown — June 2022 – Present

- Developed a comprehensive open-source framework in ROS for coordinating multiple small-scale autonomous vehicles (Asinus Cars) using Python and C++.
- Engineered a low-cost localization system utilizing ArUco markers and Kalman Filters for real-time multi-agent pose estimation.
- Implemented a centralized vehicular network to facilitate V2V (Vehicle-to-Vehicle) communication, enabling real-time data sharing of state and maneuver intentions.
- Integrated a fine-tuned MobileNetv1 + SSD object detection model for obstacle avoidance and environmental perception.
- Published "DonkieTown: a Low-cost Experimental Testbed for Research on Autonomous Cars" as primary author in **IEEE Latin America Transactions**: ieeexplore.ieee.org/document/10172136.

Technical Skills

Software & Languages: Python, C/C++, Perl, R, Shell Scripting, HTML/CSS.
Tools & Infrastructure: Git, Docker, CI/CD (GitHub Actions), Linux (Ubuntu), Unit Testing.
Hardware & Architecture: SystemVerilog, CPU Microarchitecture, FPGAs, Embedded Systems, Assembly.
AI & Robotics: ROS, PyTorch, OpenCV, Gazebo Sim, NVIDIA Jetson, MATLAB/Simulink, Scikit-learn.

Awards and Honors

Fourth place in CroCoDL Challenge | International Conference on Computer Vision 2025.
First place in Mexican Robotics Tournament 2023 | Mexican Federation of Robotics.
First place in Solve For Tomorrow 2018 | Samsung Electronics Mexico.
Silver Medal in National Physics Olympiad | Mexican Physical Society.