Wylliam Cantin Charawi, CEP

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Experience

Computer Vision Research Developer, Zebra Technologies – Montreal, QC Oct. 2025 – Present
- Researching MDE and 3D reconstruction for industrial applications using deep learning and computer vision.

Vision & Graphics Researcher, CVG Kawasaki Lab, Kyushu University – Fukuoka, JP May 2024 – Sept. 2025
- Published **DCCVT** to International Conference on 3D Vision (**3DV**).

Computer Vision Research Developer, Zebra Technologies – Montreal, QC May 2023 – Aug. 2023
- Developed a **Python** pipeline tool to augment barcode datasets using **C++** and the Matrox Imaging Library to create test files and run benchmarks on different AI models and algorithms, reducing costs by 1500%.
- Captured real-world hazmat label data, built and augmented a dataset, and trained an **RTMDet/YOLO** model to accurately recognize labels in video feeds with 98.2% accuracy.

Analyst Programmer, Loto-Québec (Technologies Nter) – Montreal, QC Jan. 2022 – Apr. 2022
- Developed and improved the performance of several **Vue.js** components, resulting in a fluid and responsive UI.
- Proposed a **Bootstrap** and **CSS** typography solution, resulting in a responsive and dynamic UX.
- Implemented improvements to Agile practices within the team, leading to the adoption of story points.

Junior Developer, Vokeso (Gold Microsoft Partner) – Montreal, QC May 2021 – Aug. 2021
- Developed Dynamics 365 extensions (**C/AL**) and a full-stack web application (**React.js, PHP, MSSQL**), while managing containerized database infrastructure using **Docker** and **Azure**.

Leadership

SWE Representative Administrator, Association Étudiante ÉTS – Montreal, QC Sept. 2021 – May 2024
- Sat on AÉÉTS board of directors, managing a 1M$ budget and organized activities for SWE students

Technology Application Technician, ÉTS – Montreal, QC Sept. 2021 – May 2024
- Tutored students for their mechanical, electrical and optical physics lab activities (ING150, PHY332, PHY335)

Publications & Projects

DCCVT: Differentiable Clipped Centroidal Voronoi Tessellation | *Pytorch* github.com/tiwylli/DCCVT
- Novel framework for paving Voronoi diagrams with differentiable clipped centroids to extract high-quality meshes from SDF using **PyTorch**, outperforming SotA marching tetrahedra and Voronoi-based methods.

Voronoify | *Python, CUDA C++, Rust* github.com/tiwylli/voronoify
- Engineered multiple high-performance implementations of a Voronoi image generator, targeting CPU, multi-core CPU, and GPU architectures to analyze performance trade-offs.
- Developed a native CUDA C++ solution using the Jump Flooding Algorithm (JFA) for labeling and a custom parallel reduction kernel for color averaging, eliminating host-device transfer bottlenecks.

Rendering Engine – Monte Carlo Path Tracer | *Rust, Python, Blender* github.com/tiwylli/PBR-Engine
- Implemented a physically based Monte Carlo path tracer featuring Multiple Importance Sampling (MIS) and Next-Event Estimation (NEE), extending light transport support to homogeneous participating media via Henyey–Greenstein phase functions.
- Engineered a hybrid intersection pipeline combining standard mesh traversal with ray-marched Signed Distance Fields accelerated by Bounding Volume Hierarchies, integrated with Intel OIDN for denoising.

Education

École de Technologie Supérieure (ÉTS) – PhD in Computer Vision & Graphics December 2027
École de Technologie Supérieure (ÉTS) – B.Eng. in Software Engineering August 2024