

# Wylliam Cantin Charawi, CEP

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## Experience

- 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 AÉETS 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](https://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.
- Voronoiify** | *Python, CUDA C++, Rust*      [github.com/tiwylli/voronoiify](https://github.com/tiwylli/voronoiify)
- 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.
  - Built a memory-safe, parallel version in Rust with Rayon, providing an alternative for systems without a GPU.
- Rendering Engine – Monte Carlo Path Tracer** | *Rust, Python, Blender*      [github.com/tiwylli/PBR-Engine](https://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)** – M.Sc.A in Information Technology Engineering      December 2025
- École de Technologie Supérieure (ÉTS)** – B.Eng. in Software Engineering      August 2024