

Research Project: Navigation Integrity of Lidar-based localization - Navigation Laboration Illinois

Lidar-based localization of autonomous vehicles in an area with low **GNSS** availability, with a Velodyne's Puck sensor to compensate for **IMU** drift to ensure landmark identification against the misassociation problem. I established an error model to quantify precise 3σ probabilities of tree misdetection, considering multiple noise sources. I also researched the implementation of the Error Correction Codes domain (**Hamming and BCH codes**) for navigation safety.

Master's Thesis: Isogeometric Representation of Turbojet Blades - Structure Mechanics Laboratory

Building an algorithmic solution to merge CAD and FEA methods through Non-Uniform Rational Basis Spline (**NURBS**) manipulations. I designed an adaptive fillet to join the blade and its root volumes by implementing a fillet patch mesh on **Python: NumPy - geomdl**.

Personal projects

- **Path Finding app** using C++ and Qt: real-time visualization of algorithms (Dijkstra, A*, Maze Generation) through multithreading.
- **VGG16 and ResNet50** blood cells classification, using TensorFlow and data augmentation with image data generators.
- **Graph SLAM** implementation from scratch, using Lidar measurements from the Victoria Park Dataset.
- **Kinematics and dynamics modeling** of a Scara Robot with PID and linearized command control.
- **Consciousness and Neuroscience research project** Statistical and Bayesian Brain.