YINGTONG LUO

TEL: +1 4384395122 · E-mail: yingtong.luo@mail.mcgill.ca · www.linkedin.com/in/yingtongluo

EDUCATION BACKGROUND

McGill University, Canada *Sep 2021 – Jun 2026 (Expected)*

Bachelor of Engineering, Mechanical Engineering

Cumulative GPA: 3.83/4.00

Awards: Fletcher Undergraduate Research Award, Class of 83' SURE Award

Relevant Coursework: System Dynamics and Control, Deep Learning, Engineering Graphics, Computer-Aided Design (CAD), Numerical Methods, Mechanics of Materials, Finite Element Analysis (FEA), Principles of Manufacturing, Fluid Mechanics

ACADEMIC EXPERIENCES

Research Assistant

Increasing Autonomy of Log-Loading Operations *May 2025 – Ongoing*

McGill University, Aerospace Mechatronics Lab

- Simulated log yard environments using Isaac Sim to generate more than 500 synthetic scenes with domain randomization for deep learning-based SLAM applications.
- Tuned simulation and rendering parameters to improve the realism of synthetic scenes, enhancing the dataset quality.
- Leveraged VGGT, a state-of-the-art vision transformer for geometric perception, to reconstruct high-fidelity 3D point clouds from stereo image pairs, enhancing reconstruction realism by injecting artificial noise.
- Enabled model training to accurately identify trucks, infeed decks, and log piles, supporting autonomous navigation and 3D object detection for vehicles in the mill yard.

Achievements:

- Contributed to reducing human labor and improving operational efficiency in forestry through scalable data-driven solutions.
- Earned positive feedback from industry collaborator FPInnovations for the innovative use of synthetic data to address data scarcity in forestry automation.
- Demonstrated the feasibility of training object detection models on fully simulated environments, validating the pipeline's effectiveness in real-world applications.

Research Intern

Deep Learning-Based Rebar Instance Segmentation and Dimensional Quality Control *May 2023 – Dec 2024*

McGill University, AIS Lab

- Built a comprehensive 3D dataset of rebar structures by collecting 3,000+ high-resolution images and generating 400 synthetic point clouds using BlenderProc, improving deep learning model robustness and generalizability.
- Reconstructed point clouds from 2D images and videos via Structure-from-Motion (SfM) using MetaShape and OpenMVS, achieving <2% noise for precise dimensional quality control.
- Trained and evaluated state-of-the-art deep learning models (e.g., Oneformer3D) using PyTorch and Open3D for point cloud segmentation, achieving 95.4 mAP on test datasets.
- Diagnosed domain adaptation challenges between synthetic and real data; improved model accuracy by scale aligning synthetic point clouds after extensive experimentation.

Achievements:

- Developed a scalable synthetic data generation pipeline to support point-cloud-based rebar segmentation in real world construction scenarios.
- Co-authored a paper titled "*A Synthetic Data Generation Pipeline for Point-Cloud-Based Rebar Segmentation*", accepted to ISARC 2025; to be presented in July 2025.
- Demonstrated strong research independence, technical problem-solving skills, and cross-domain learning in applying AI to engineering automation.

Design Engineer

Design of A Two-Stage Reduction Gearbox for A Solar-powered Aircraft *Sep 2024 – Dec 2024*

McGill University

- Designed a two-stage reduction gearbox for a light aircraft, achieving a 20% weight reduction compared to initial estimations while ensuring compliance with FAA safety factor requirements.
- Conducted strength calculation for shafts, gears, keys, and bearings, adhering to AGMA standards, ensuring the lifespan exceeds 10,000 hours under variable operational loads.

Achievements:

- Delivered a full technical design report and engineering drawings, receiving top evaluation in a capstone mechanical design review panel.
- Validated the gearbox design through finite element analysis (FEA), identifying and mitigating potential failure points under peak loading.

INTERN EXPERIENCE

Assistant Design Engineer

Xinyi Glass Holdings Limited. *May 2023 – Aug 2023*

- Conducted 200+ mechanical tests and performance analyses on glass products to ensure compliance with engineering quality standards and safety specifications.
- Conducted quality inspections and implemented quality control measures to identify defects, ensuring consistent product excellence.
- Utilized CAD software to create 60+ detailed 3D models and drawings, assisting in designing and prototyping glass components, contributing to the development of precise and manufacturable product models.
- Diagnosed workflow bottlenecks and proposed improvements, contributing to broader process optimization efforts.
- Collaborated with engineers and technicians to optimize manufacturing processes, increasing production efficiency by 18 minutes per batch and reducing industrial waste by 25%.

Achievements:

- Improved production efficiency and reduced material waste by supporting process optimization with the engineering team.
- Maintained high product quality standards by proactively detecting and reporting production defects during inspections.

PUBLICATION

Sun, T., **Luo, Y.**, & Shao, Y. *"A Synthetic Data Generation Pipeline for Point-Cloud-Based Rebar Segmentation."*
Accepted for presentation at the 42nd International Symposium on Automation and Robotics in Construction (ISARC 2025).

EXTRACURRICULAR ACTIVITY

Principal Member

McGill Formula Electric *Oct 2022 – Jun 2024*

- Contributed to the design and manufacturing of a fully electric formula-style race car.
- Performed front-wing aerodynamic simulation and topology optimization for performance improvement.
- Collaborated with 100+ interdisciplinary members dedicated to engineering innovation.

Achievement: Helped the MFE team secure a Top 4 finish in international FSAE electric vehicle competition.

TECHNICAL SKILLS

Software: SOLIDWORKS (4 yrs), MasterCAM (2 yrs), ABAQUS (2 yrs), ANSYS (1 yr), Metashape (2 yrs), CloudCompare (2 yrs)
Programming: Python (4 yrs) - PyTorch, Open3D, OpenCV, NumPy; MATLAB (4 yrs); Docker (2 yrs)
Languages: English (Proficient), French (Intermediate), Mandarin (Native)