Trifko Basic

Location: Toronto, Ontario, Canada

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Education

Queen's University — Kingston, Ontario, Canada

MASc in Mechatronics & Robotics Engineering — *Sep 2021 – Aug 2023*

BASc in Mechanical Engineering, First Class Honours — *Sep 2017 – April 2021*

Technical Skills

Languages : Matlab (Advanced), C/C++ (Experienced), Python (Experienced), Visual Basic.NET (Proficient)

Software : SolidWorks, Inventor, Vault, Ansys, Simulink, Gazebo, ROS2, Roboguide, Unity, Prototwin

Work Experience

Mechanical Designer — Jan 2024 – present

MPAC Group: Packaging Automation Company

- Designed robotic work cells for the automated packaging industry, valued at around $2 million
- Developed robotic tooling and linear/rotary drive systems for motion-control systems
- Used CAD and FEA to design components for machines and applied GD&T to designs
- Experienced in choosing materials and manufacturing methods (CNC machining, welding, sheet metal, injection molding, FDM printing) based on strength, weight, cost, feasibility, and reliability
- Architected a motion-control strategy for a robotic pick-and-place application, resulting in a $100 k sale
- Hands-on experience programming FANUC robots to test tooling prototypes for product handling applications
- Created simulation models to analyze system dynamics, test control logic, and evaluate environmental interactions
- Collaborated with multidisciplinary engineering teams, engaged in client-facing interactions, and designing machines in compliance with ISO standards

Graduate Teaching Assistant — Sep 2021 – April 2023

Queen's University - Mechanical & Mechatronics and Robotics Engineering Departments

- Conducted Labs, Tutorials, and Office Hours for Automatic Controls and Digital Systems in Mechatronics
- Head TA for a 2nd year Mechatronics lab course responsible for training teaching assistants
- Programmed Arduino and Raspberry Pi systems for motor, pneumatic, and thermal control applications
- Experienced in sensor calibration and signal processing for IMU, range, vision, speed, and thermofluid sensors

Lab Development Intern & Research Assistant — May 2021 – Aug 2022

Queen's University - Mechatronics and Robotics Engineering Department

- Designed second-year Mechatronics courses, covering fluid mechanics, heat transfer, and digital systems in Mechatronics
- Built and tested lab prototypes involving; hardware selection, circuitry, machining, soldering, and programming
- Collaborated with professors and technicians to ensure the labs aligned with curriculum goals and safety standards
- Researched into microfluidic logic, focusing on logic operations and manufacturing techniques
- Characterized pneumatic switches by measuring response time variations across different diaphragm materials
- Experimented with laser-cut adhesives and heat press bonding techniques in multi-material assemblies
- Rapidly iterated through prototypes of a meso-scaled pneumatic switch using FDM & SLA printing, laser-cutting, and layered manufacturing

Master's Research

Novel lightweight mobile robotics platform leveraging soft pneumatic actuators — Sep 2021 - Aug 2023

Queen's University - Ingenuity Labs Research Institute

- Research focused on actuator performance and control in mobile robotics, exploring motion planning architectures across humanoid, quadrupedal, and wheeled robotics
- Took graduate level courses covering: FEA, CFD, SLAM, MPC, IK & ID solvers
- Built a bench-top experiment to validate a MATLAB-developed soft actuator model and assess power output control
- Journal Paper submitted to IJRR: *Trifko Basic*, Matthew A. Robertson*. **Mechanical power modulation of iPAM soft actuators through exhaust flow regulation for scalable mobile pneumatic robots.**