Yulim Lee

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Education

Graduated June 2019 — **Bachelor of Applied Sciences**, *University of Toronto*
Major in Mechanical Engineering, Minor in Robotics and Mechatronics

Mar 2016 & Nov 2018 — *George Brown College*
Machining Courses: Machining I, Machining III, Welding

Technical Skills

Modeling: Solidworks and Inventor; AutoCAD; ANSYS; PSpice; MATLab & Simulink; Simio
Programming: C, C++, Python, ROS, Git Bash
Microsoft: Word, Excel, PowerPoint
Machining: Lathe, Mill, Drill Press, Welding (Stick, Oxyacetylene), Circle Grinder

Relevant Engineering Experiences

Sept. 2017 – Aug. 2018 — **Mechanical Engineering Intern,** *Isowater Corporation*

- Collaborated with chemical and electrical interns to interpret PIDs, procure parts, and build prototype piping sub-assemblies and frames of chemical process systems.
- Using Inventor and AutoCAD, created 3D models and 2D engineering drawings of chemical process systems and workspace so coworkers visually understood space constraints and layout.
- Acted as key point of contact with operator from partner university, troubleshooting issues with the provided prototype and receiving weekly updates.
- Completed documenting past projects by updating the BOMs and part drawings, finishing incomplete/missing files, and registering all changes into the company database.
- Validated the structural strength of heavy equipment skid, shipping container supports and customized parts with stress calculations with variables done on Excel and FEA on ANSYS

Nov. 2016 – Aug. 2017 — **Chassis Fabrication Team Member,** *U of T Solar Car Design Team*

- Cooperated with supervisors and fabrication members to construct the hybrid monocoque chassis, including its plug, mould and modifying the main composite body.
- Fabricated custom carbon fiber and fiberglass composites, from cutting carbon fiber/fiberglass sheets, foam board and honeycomb sheets, applying the epoxy and preparing the vacuum mold.
- Interpreted rough drawings and instructions to mill and lathe custom metal moulds, slots, inserts, laminate sheets. Consulted supervisor for more details to machine the suspension system's beams.
- Enhanced the chassis' aerodynamic properties, smoothing plugs, moulds and chassis, by sanding and applying filler.

Relevant Engineering Projects

Jan. 2019 – May 2019 — **Programming Turtlebot2,** *University of Toronto (MIE443)*

- Worked on a team of four to consolidate independently written functions and states, ensuring each would trigger and transition appropriately.
- Determined a brute force algorithm for the travelling salesman problem was the optimal solution for a path planning challenge and coded it for the Turtlebot2.
- Impressed judges on programming Turtlebot2 to recognizably emote rage with programmed movements and sounds after sensing a hit.
- On bi-weekly basis, met with team to brainstorm, address issues, and extensively tested code on Turtlebot2 to ensure current progress was on track.

Relevant Engineering Projects Continued

Sept. 2018 – May 2019 **Passive Airship Pressure Regulator**, *SolarShip & University of Toronto (MIE491)*

- With a four-student team, designed a custom valve to regulate an airship's ballonet system.
- Determined the dimensions of the chosen valve design using force analysis, ensuring it met the design objectives.
- Assembled, rendered and animated the 3D model to visually explain how the valve worked.
- Adhering to a predetermined schedule, provided client with presentations and reports to guarantee client's on-going satisfaction with the developing design.

Sept. 2018 – Dec. 2018 **PID-Controlled Pendulum**, *University of Toronto (MIE404)*

- On a team of four, accomplished in programming a pendulum with a motor-powered propeller so that it would immediately return to its set angle, static or dynamic, after forced displacement.
- Determined the K coefficients of the PID using both the Ziegler–Nichols tuning method and manual tuning to achieve the desired step response, verifying with physical testing.
- Consulted with TA, professor and other groups on troubleshot problems and what mistakes to avoid, in order to reduce wasted time and confusion.

Sept. 2018 – Dec. 2018 **Programming a Robot Manipulator**, *University of Toronto (AER525)*

- Programmed a SCORBOT-ER 4u to quickly move blocks to defined positions while avoiding collisions.
- Collaborated with 2 others to verify the maximum velocity and range of the SCORBOT-ER 4u after calculating the theoretical values with forward kinematics and velocity kinematics.

Jan. 2017 – May 2017 **Lap Joint Design**, *University of Toronto (MIE320)*

- Cooperated with a partner to improve a lap joint for the greatest ultimate stress per weight.
- Using Solidworks and ANSYS, analyzed the original design to remove mass and reduce stress concentrations by simulated iterations of improved designs.
- After physical testing failure, re-engineered design with a flexible bonding tape to address newly found flaws in the bonding agent, correcting old errors in the FEA simulations.

Jan. 2017 – May 2017 **Heat and Mass Circuit**, *University of Toronto (MIE313)*

- On a team of four, established the heat and mass properties of a circuit board through several laboratory tests in order to create accurate models.
- Modified 2D numerical energy balance equations to model in 3D without increasing the number of nodes, reducing both model and code complexity.
- Determined the best arrangement of heat sinks for a circuit board by coding MATLAB scripts that predicted the temperature gradient, and verified the accuracy of the simulation.

Sept. 2016 – Dec. 2016 **Automaton Nutcracker Design**, *University of Toronto (MIE491)*

- Work with three teammates to redesign a nutcracker toy to emulate human-like movements of swinging a hammer down while applying enough force to crack a walnut.
- Created the kinematic stick model of the toy with a kinematic modeling program to verify the movements realistically emulated a human swinging a hammer down.
- Analysed kinematic models to discover which dimensions would apply the force required to crack a walnut, and confirmed conclusions with static force analysis.

Jan. 2016 – May 2016 **Airplane Stringer Stress Analysis**, *University of Toronto (MIE301)*

- Validated stress analysis results by using different methods, consolidating the data from finite element analysis, photoelasticity analysis, strain gauge analysis, and tensile strength analysis.
- Collaborated with 5 students to write a report summarizing the airplane stringer's stress properties, assessing the compatibility and reliability of each analysis method.