Dongyoung Kim

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Education

McMaster University Hamilton, ON
Bachelor of Materials Science and Engineering (Co-op) *Sep. 2024 – 2029*

Technical Skills & Interests

Data Analysis: Excel, Python, Java, MATLAB, Data Visualization
CAD: Autodesk Inventor, AutoCAD, ANSYS Granta EduPack
Manufacturing: G-code, Klipper, Slicers (PrusaSlicer, Cura, Creality Print)
Fabrication: FDM 3D Printing, Drill Press, Miter Saw, Table Saw, Belt Sander

Projects

Custom High-Speed 3D Printer | *Raspberry Pi, Klipper, G-code, PrusaSlicer, SPI* Sep. 2025 – Oct. 2025

- Integrated mechanical, electrical, and firmware subsystems (BLTouch, ADXL345, BMG extruder) to raise stable print speed from **55 mm/s → 200 mm/s (+264%)**.
- Tuned **input-shaping** parameters to reduce vibration, improving accuracy and cutting ghosting by **97%**.
- Designed a **structured test log** and analyzed results in **Excel** to correlate settings to print quality and **repeatability**.

Modular Shelving System | *DFM, AutoCAD, Inventor, 3D Printing* Sep. 2025 – Oct. 2025

- Evaluated structural materials (wood vs. steel) and selected **3/8" birch dowels** for stiffness-to-cost, reducing material cost by **88%** with negligible deflection at **50 kg**.
- Optimized press-fit connector design, reducing total cost to **$5.82** per shelf unit.
- Redesigned bracing geometry to achieve a **50 kg** rating with **2× safety factor**; scalable to **6 stories**.
- Developed **DFM-oriented CAD** with **critical dimensions** and **inspection points** to improve manufacturability and assembly repeatability.

Microplastic Filtration System for Water Treatment | *Materials Selection, FEA, LCA* Jan. 2025 – Feb. 2025

- Designed a high-carbon steel filter (**10–20 μm**): 24M ∅5 μm pores, 60% porosity, **≤1 particle/L** in effluent.
- Verified the design via **stress modeling**, confirming **108.6 MPa** yield strength (**1.08 SF**) at 60% porosity.
- Optimized material selection in **ANSYS Granta EduPack**; built **Ashby charts** and a **custom MPI** to rank materials, selecting high-carbon steel (**63% score**) for durability and corrosion resistance.
- Performed **LCA** to quantify sustainability (**0.844 kg CO_2/kg**) and recyclability, supporting alignment with provincial environmental requirements.

Rubik's Cube Simulation & Logic Engine | *Python, Data Structures, Algorithms* May 2025 – June 2025

- Developed data structure, mapping **54** unique positions using a custom indexing system for 3D → 2D mapping.
- Engineered a movement engine to handle **12 standard rotations**, utilizing simultaneous tuple unpacking to manage complex state changes and string parsing.
- Implemented a **command-line UI** tool to present 3D states onto a 2D net, enabling **real-time debug** for move strings and state integrity.

Leadership & Activities

Co-Founder & Lead Organizer, Math Club (High School) Oct. 2023 – June 2024

- Revived inactive club post-COVID; grew members from 0 → 7 through weekly problem-solving sessions.
- Organized prep workshops for University of Waterloo math contests; represented school in 3 regional competitions.
- Created promotional materials using Desmos graphing art repository, increasing club visibility and engagement among STEM students.

Experience

Dishwashing & Sanitation Lead Dec. 2021 – Nov. 2022
Nagano Sushi *Cambridge, ON*

- Sustained efficient labor under **high-volume** conditions by **optimizing workflow** layout and time sequencing.
- **Coordinated** task distribution during peak demand to improve station efficiency and service continuity.