



TRENT POITRAS

Biomedical Mechanical Engineering + Computing Technologies

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trentpoitras.com

3×

U Ottawa Design Day Winner

R&D

Biomedical Device Development

25%

PepsiCo Yield Improvement

B2

French Certified

EDUCATION

University of Ottawa — Biomedical Mechanical Engineering with a double degree in Computing Technologies

- Three-time University of Ottawa Engineering Design Day winner; bilingual English/French (DELFI B2).

TECHNICAL SKILLS

PROGRAMMING & AUTOMATION

Python, Java, C, C++, C#, MATLAB, Simulink, Arduino, AI automation/integration, Excel automation; discrete mathematics, Boolean algebra, logic gates, K-maps

FABRICATION & MACHINING

3D printing, laser cutting, sheet metal, tapping/threading, mills, lathes, drill presses, bandsaw, grinder, basic welding, hand tools

TESTING & BIOMEDICAL LAB

Tensile/compression testing, blood rheology, heart dissection, centrifuge operation, dimensional inspection, PPE/containment procedures, biomedical waste handling

CAD & MECHANICAL DESIGN

SolidWorks, 3DEXPERIENCE, GD&T/ASME Y14.5, tolerancing/fits, assemblies, BOMs, manufacturing drawings, gear/shaft/bearing design, fatigue analysis

ELECTRONICS & CONTROLS

Soldering, breadboards, servo/DC motors, wiring, multimeters, oscilloscopes, flex/pulse/temp/humidity/force/pressure sensors, optical encoders, PID/PD control, transfer functions, root locus

DATA & PRODUCTIVITY

Advanced Excel (pivot tables, lookups, charts, formulas, macros, Power Query), data visualization, Microsoft 365

ENGINEERING EXPERIENCE

● Mondal Pediatrics | R&D Engineer

May 2026 - Present

Hamilton, Ontario

- Lead development of a portable, low-cost CPR training doll integrating mechanical design, materials, fluid-dynamics considerations, hardware, and software.
- Create complex SolidWorks CAD drawings and multi-component designs to support accurate, repeatable manufacturing.
- Develop an AI-based training agent using Canadian Red Cross resources, with three testing levels assessing knowledge, situational awareness, response quality, and reaction/response time.

● PepsiCo | Quality Engineer Co-op

Apr 2025 - Aug 2025

Mississauga, Ontario

- Owned tracking of rejects, yield, inventory variance, concentrate receiving, Brix, pH, titratable acidity, CDS, and DNC metrics during peak production.
- Created SOPs/OPLs and automated Excel-based Brix targeting/tracking workflows; process changes contributed to a 25% quarterly increase in yields during the plant's busiest period.
- Led root-cause investigations into Lubodrive/can-line issues through titration and chemical testing, coordinating diagnosis and repairs with contractors.

SELECTED ENGINEERING PROJECTS

Workout Wrist Strap for Hand/Wrist Disability & Dexterity Limitations *U Ottawa Design Day 2024 Winner* | *Patent Pending*

- Designed and iteratively prototyped an assistive strap using polyester elastic, braided nylon, and industrial Velcro; applied biomechanics and stress/strain analysis to support exercise and daily tasks.
- Improved materials, adhesion, sewing method, and geometry until the design supported loads up to 300 lb; user testing showed improved exercise capability for a user recovering from spinal injury.

Robotic Hand Prosthetic Controlled by Flex-Sensor Glove *Arduino* | *C++* | *3D Printing*

- Built a functional prosthetic-hand prototype using five flex sensors, five servo motors, an Arduino Uno, soldered electronics, fishing-wire tendons, and custom 3D-printed gears/components; programmed control logic in Arduino/C++.

Bobbin Assembly for 3D Topology Optimization Manufacturing *Mechanical Design* | *Research Project*

- Designed a compact bobbin and loading system for continuous carbon-fibre polymer-matrix composite manufacturing, including a 6061-T6 shaft, tension-control path, spool arms, cam-and-follower docking mechanisms, and a 2:1 straight-bevel gear train.

- Designed for manufacturability, quick loading, secure retention, and up to ± 10 mm lateral / $\pm 10^\circ$ angular misalignment while maintaining compatibility with alternate material spools.

Automatic Balancing Inverse Pendulum *Control Systems* | *MATLAB/Simulink* | *Arduino*

- Modelled nonlinear cart-pendulum dynamics, linearized the system, derived transfer functions, used root-locus analysis, and implemented/tuned a real-time PD controller with encoder feedback on Arduino.
- Built the physical system using a 12 V DC motor, belt-driven linear cart, optical encoder, and L298N driver; experimental testing showed PD control was more stable than PID for the physical plant.

Gear Reducer for Low-Speed Industrial Conveyor *Machine Design* | *SolidWorks* | *GD&T*

- Co-designed a 3 hp, 60-to-25 rpm lateral-offset helical gear reducer, completing Lewis tooth-bending and Hertz contact analysis, shaft sizing/fatigue verification using modified Goodman, bearing selection, key/keyway design, force/shear/moment/deflection checks, and thermal analysis.
- Produced a complete SolidWorks assembly/detail drawing package and BOM conforming to ASME Y14.5 GD&T standards, with component safety factors above 1.5.

Cart Compare - Grocery Price Comparison App *U Ottawa Design Day 2024 Winner* | *Scholarship Awarded*

- Created an Android APK concept integrating store databases and AI-assisted analysis to compare individual product prices and full grocery-cart costs by location/store preference, including coupons and sales.

ADDITIONAL PROFESSIONAL EXPERIENCE

● Print It Custom Founder & Manager <i>Milton, Ontario</i> • Manage a custom apparel/product business serving universities and businesses from consultation and quoting through sourcing, production, and delivery. • Built an AI-powered ordering system with a WhatsApp chatbot, Excel-integrated client/order records, automated email follow-ups, and a live mockup tool to reduce manual back-and-forth and streamline ordering. • Design products, manage budgets and inventory, prepare quotes/invoices, and create custom 3D-printed designs to client specifications.	Dec 2018 - Present
● AFIMAC Canada Lead Recruiter <i>Guelph, Ontario</i> • Built an AI automation workflow that converted applicant information into structured profiles, reducing manual sorting effort; served as first point of contact in English and French and produced client-facing reports.	May 2026 - Sep 2026
● University of Ottawa Ambassador / Social Media Coordinator <i>Ottawa, Ontario</i> • Deliver tours for prospective undergraduate, master's, and PhD students in engineering, health sciences, medicine, and science; maintain a 9.9 tour rating and create bilingual recruitment content.	Sep 2025 - Present
● Monster Energy Brand Representative <i>Ottawa, Ontario</i> • Create campus events and partnerships, coordinate inventory/logistics, and build brand visibility through student and club engagement.	Sep 2023 - Present

OTHER WORK EXPERIENCE

PepsiCo — Merchandiser | Mississauga, Ontario | May 2024 – Aug 2024 • Returned the following summer as Quality Engineer Co-op.
Additional retail & customer-facing experience: Lucky Brand Jeans — Team Lead; Diesel — Sales Associate; Spartan Fitness — Sales Associate.

LEADERSHIP

Math for Monster <i>Creator</i> <i>Sep 2025</i> Created a daily engineering math challenge; increased estimated student-society engagement by 15x.	Engineering 101 Week <i>Guide</i> <i>Sep 2026</i> Guided first-year engineering students through programming and supported their transition to university.
Char-Lan Rebels <i>Assistant Captain</i> <i>Winter 2024</i> Junior B assistant captain; communicated across age groups and supported morale in high-pressure situations.	Ontario Educational Leadership Centre <i>Selected Attendee</i> <i>Summer 2018</i> Selected for a week-long leadership camp; voted most positive male leader.

RESEARCH, CERTIFICATIONS & SAFETY TRAINING

Publication: "A Review on Polymeric Biomaterials: Market Landscape, Competitors and Innovation Pipeline" - Scholastic Open Access, with Professor Bill Tawil (UCLA).
SolidWorks: Certified 3DEXPERIENCE 3DSwymer Associate
Public Health Agency of Canada (2026): Biological Safety Cabinets; Biomedical Waste; Containment Level 2 Operational Practices; General Safety Practices for Containment Laboratories
Languages: English (Fluent); French (Fluent, DELF B2 Certified)