ANDREI VELICHE

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EXPERIENCE   *Employable Starting July 2024*

Fulfil Solutions   July 2023 - December 2023
Mechanical Systems Engineer Co-op   *Mountain View, CA*
- Optimized robotic bag-packing procedures via physics-based modeling (SW Motion Studio, Blender, MuJoCo) and Runge-Kutta numerical simulations to reduce impact events and SKU damages.
- Calibrated, bench-marked, and assembled multi-axis automation machinery for accelerating store throughput and guaranteeing precise product handling.
- Conducted life-cycle testing on round timing belts in ambient and refrigerated environments to improve their tensile fatigue strength while testing new manufacturing methods, significantly reducing factory maintenance times.
- Managed a software team to integrate an enhanced computer vision algorithm into production code, enabling a 500% improvement in drop-targeting accuracy.

Mesodyne   June 2022 - January 2023
Nanophotonics R&D Engineer Co-op   *Somerville, MA*
- Analyzed vacuum-packaged thermal systems using black-body calorimeters, thermocouples, thermistors, and thermal cameras to detect heat losses and improve power generation unit efficiency.
- Designed an actively cooled radiative emissions calorimeter accurate within 5 Watts, manufactured though SLS printing and 5-axis machining, then employed MATLAB thermofluid models for precise performance metrics.
- Investigated thermoacoustic instabilities at burner ignition using robust signal filtering algorithms in RTOS for Arduino, STM32, and nRF52.
- Developed embedded data acquisition circuit boards in KiCAD, coded GUI applications in Python, and implemented post-processing data pipelines, to visualize high-volumes of experimental data.

RESEARCH

Flight Simulator Chair   January 2024 - Present
Senior Capstone Project   *Boston, MA*
- Constructing an X-Plane-compatible, highly dynamic flight simulator chair capable of ±25 deg roll and pitch maneuvers, attaining a market advantage in range and rate of motion.
- Wrote parametric static force solvers for fine-tuning gimbal mechanism geometries and analyzed dynamic system response and motor loading to reduce component costs.

Self-balancing Inverted Pendulum   June 2019 - September 2020
Personal Project   *Boston, MA*
- Designed and implemented a self-balancing inverted pendulum mechanism to demonstrate feedback control concepts.
- Developed a novel 3D-printed mechanical flexure component to reduce linear rail precision requirements and conducted FEA and tolerance stack-up analysis to minimize machining complexity.

Physics-Informed ML   September 2022 - June 2023
Northeastern University Undergraduate Researcher   *Boston, MA*
- Directed research in the meta-modeling of physics-informed Neural Controlled Differential Equations using PyTorch and Tensorflow to accelerate fragility curve generation for seismic structures
- Prepared weekly presentations in a graduate school setting under department chair Prof. Jerome F. Hajjar.

EDUCATION

Northeastern University   September 2020 - August 2024
Candidate for BS in Mechanical Engineering and Physics, Minor in Mathematics   *Boston, MA*
- **GPA:** 3.97/4.0 (Dean's List)
- **Activities:** AeroNU, FTC Mentor, Formula SAE, Putnam Math Club, Brazilian Jiu-Jitsu

NEU Work-Study   January 2020 - May 2022
Junior Machinist   *Boston, MA*
- Provided machining support for capstone students while balancing design requirements with tool limitations.
- Acquired experience in DFM, lathe & mill usage, material selection, thermal effects, GD&T (ASME Y14.5), tolerance stack-ups, speeds and feeds, and tool geometries.

SKILLS

Software: SolidWorks, Ansys, ABAQUS, HSMWorks, AutoCAD, Fusion 360, MATLAB, Simulink, Python, C++, C#, Java, LaTeX, Maple, MuJoCo, PyDrake, KiCAD, EASII, STM32CubeIDE, Ocean Insight, Neo4j, Big Query, MS Suite
Hardware: Manual/CNC mills & lathes, MIG welding, water-jetting, laser cutting, carpentry, SLS/FDM 3D-printing
Certifications: Electric Scissorlift, Class IV Forklift