ANDREI VELICHE

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Education

Northeastern University Sept 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:** Formula SAE, AeroNU, Putnam Math Club, Brazilian Jiu-Jitsu

Experience

Fulfil Solutions Jul. 2023 - Dec. 2023
Mechanical Systems Engineer Co-op *Mountain View, CA*

- Innovated a deterministic drop targeting algorithm for dispensing SKUs into line-following bags, facilitating Lagrangian mechanics, MuJoCo simulations, Scipy numerical integration, and empirical testing. Followed by C# implementation for use in production codebase for improvement of overall bag packing reliability.
- Conducted life-cycle testing for a variety of timing belts in ambient and refrigerated environments while improving their tensile fatigue strength through iterative prototyping to reduce factory-wide maintenance time.
- Wired, calibrated, bench-marked, and tuned multi-axis tray shuttles and dispense arms using laser range finders, plunge dial gauges, ELMO controllers and EASII software.

Mesodyne Jun. 2022 - Jan. 2023
Nanophotonics R&D Engineer Co-op *Somerville, MA*

- Designed and manufactured an actively-cooled radiative emissions calorimeter for the measurement of propane burner black-body radiation. Complemented with MATLAB thermofluid simulations and custom calibration procedures to assimilate data into burner performance metrics.
- Miniaturized a propane burner air intake module by designing custom STM32-based embedded electronics, and overcoming thermoacoustic instabilities at ignition via fan affinity laws, sensor feedback control, and signal filtering.
- Enabled rapid data-acquisition and sensor fusion by developing custom ATmega32-based DAQ circuit boards and programming intuitive GUIs in Python.

Capstone Machine Shop at NEU Jan. 2021 - May 2022
Junior Machinist Work-Study *Boston, MA*

- Provided machining support for capstone students while balancing design requirements with tool limitations
- Acquired expertise in manual lathe & mill usage combined with practical knowledge of material selection, thermal effects, GD&T, tolerance stack-ups, speeds and feeds, and tool geometries.
- Collaborated with machinists to design a bench-mounted tool post for tightening both small or large ER-32 collets

Projects

Flight Simulator Chair - Senior Capstone Project Spring 2024

- Constructing an X-Plane compatible, highly dynamic flight simulator seat capable of ±25 deg roll and pitch maneuvers by translating 2D gantry movement into spherical motion around a gimbal.
- Writing parametric static force solvers for fine tuning gimbal mechanism geometry, and evaluating dynamic system responses and motor loading to X-Plane outputs.

Self-balancing Inverted Pendulum Summer 2018 - 2020

- Designed and implemented a self-balancing inverted pendulum mechanism to demonstrate feedback control
- Developed a novel 3D-printed mechanical flexure component to reduce linear rail precision requirements and conducted extensive FEA and tolerance stack-up analysis to minimize machining complexity.

Research

Physics-Enabled Neural Ordinary Differential Equations September 2022 - June 2023
Northeastern University Undergraduate Researcher *Boston, MA*

- Directed research in the meta-modeling of physics-informed NCDEs as applied to non-linear Bouc-Wen dynamics for seismic modeling, using PyTorch, Tensorflow, and Linux OS, under Prof. Jerome F. Hajjar.

Skills

Software: Python, MATLAB, C++, C#, Java, LaTeX, Bash, Git, HTML&CSS, SolidWorks, OnShape, KiCAD, AutoCAD, Fusion 360, Simulink, HSMWorks, MuJoCo
Hardware: Manual and Tormach CNC mills & lathes, steel welding, waterjetting, carpentry, 3D printing (SLS/FDM)
Certifications: Electric Scissorlift, Class IV Forklift