**Sonam Okuda**

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**Education**

**The Cooper Union for the Advancement of Science and Art**

Bachelor of Engineering, Mechanical Engineering & Minor in Computer Science, May 2025

GPA: 3.80, Full Tuition Scholarship (2024-2025), Innovator Tuition Merit (2021-2025)

**Experience**

**Quadcopter Controller Design** Jun - Jul 2024

*Study Abroad Research Experience Technische Universität Dresden, Germany*

* Led the **lunar landing quadcopter** simulation project for the Flight Mechanics and Control department
* **Calibrated** FlameWheel450 quadcopter with **Pixhawk6X** using **QGroundControl** and tested flight capabilities
* Designed a testing rig to determine quadcopter **thrust coefficient**; **modeled** drone to estimate **inertia tensor**
* Developed a controller for the F450 quadcopter using **Simulink** using a linearized model of a quadcopter

**Summer STEM: Robotics Crash Course** Jun - Aug 2023

*Teaching Assistant Cooper Union, NY*

* Taught 25 high school students to manipulate simple robots using **C++** and **Python**
* Instructed classes on basics of mathematics, physics, principles of controls, design, and **CAD**
* Designed **autonomous robot algorithms** using various sensors (encoders, LIDARS, IMU), **odometry**, integration for position and angular velocity, **state machines**, and **PID control.**
* Operated fluently in an **Ubuntu Virtual Machine,** and became comfortable with a Linux environment

**Projects**

**Model Reduction Methods (Stock Market Analysis, Airfoil Wake Analysis)** Jan - May 2024

*ME-493 Data-Driven Control Cooper Union, NY*

* Implemented different **model reduction methods** (POD, ERA, SINDy) to **model airfoil wake data**
* **Reconstructed** horizontal and vertical velocity by **analyzing eigenvalue vs mode number** from SVD
* Plotted **spatial modes** and **temporal amplitudes** to observe oscillatory behavior in airfoil wake
* Analyzed the data of the top 20 S&P500 companies using a first-order **SINDy approximation** to **reconstruct** stock market trends

**Sumo Robot Competition** Jan - May 2024

*ME-353 Mechatronics Cooper Union, NY*

* Led a team to design an **autonomous robot** for a sumo-style competition
* **Breadboarded** and designed circuits with an **ATMega328P** and **MPLAB Snap Programmer**
* Used an IR sensor, tuned with a potentiometer, to sense boundary of arena
* Programmed functions in **assembly** and **autonomous routine in C**

**Plasma Rig Design for CO2 Decomposition** Jan - May 2024

*ME-360 Engineering Experimentation Cooper Union, NY*

* Conducted experiments that used **plasma dielectric barrier discharge**
* Used a **Fourier-Transform Infrared (FTIR) spectrometer** to analyze relative CO2 peaks
* Spearheaded a redesign to introduce a **piston mechanism** to move gas out of the treatment chamber and into a testing gas cell without compromising concentration data
* Designed and **3D printed new push-to-fit electrode-holding components** using CAD software

**Analysis of Aircraft-Related Events Using Machine Learning** Sep - Dec 2023

*ME-371 Data-Driven Problem Solving Cooper Union, NY*

* Employed **statistical methods** using **Pandas DataFrames** to determine correlation between factors
* Implemented different **regression algorithms** to analyze relationships between factors
* Utilized a **KNN classification** model to predict if an event was fatal or not
* Evaluated using different metrics (MSE, MAE, R2, F1-Score) to determine model accuracy

**Technical Skills**

*Computer Programs:* Rhinoceros 3D, AutoCAD, SolidWorks, OnShape, Tableau, Tracker, Oracle VirtualBox, Simulink

*Programming* *Languages:* Python, Java, JavaScript, HTML, C, C++, MATLAB, Arduino, Shell

*Relevant Courses:* Feedback and Controls Engineering, Data Structures and Algorithms, Frequentist Machine Learning, Mechatronics, Data-Driven Controls