

Benjamin Chern

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Education

Columbia University School of Engineering (Current)

May 2026

Bachelor of Science in Mechanical Engineering

- Cumulative GPA: 3.5
- Relevant Coursework: Mechatronics, Embedded Systems, Materials and Manufacturing, Mechanical Design

Minor in Computer Science

Experience

NASA Intern, Soft Robotics

May 2024 – August 2024

Designed and tested manufacturing solutions for flexible TPU based soft robots

- Fabricated a TPU based compressible endoskeleton capable of extending **3.6x** unactuated length
- 3D modeled and constructed airtight silicone molding around TPU endoskeleton, achieving **1kg** lifted with **5mm** radius
- Developed and constructed a copper stamp for sealing **10µm** TPU sheets in a heat press. Conducted thermal calculations, in ANSYS, created 3D models in SolidWorks, and machined the stamp using CNC mill to ensure precision
- Implemented control kinematics in Python and created a virtual model of the appendage.

Research, Georgia Tech RoboMed Lab

May 2023 – August 2023

Assembled and programmed tendon controlled endoscope to aid in surgery

- Author on **IEEE** pending publication, paper presented at 2024 **ISMR** conference
- Saved **\$5,000** by designing and assembling a medical phantom of the femoral artery in Fusion360 to test endoscope maneuverability.
- Wrote user friendly PID controller in C++ which actuates 8 individual motors to **< 1mm** precision
- Created Ethernet shield PCB in EAGLE software to increase serial communication speed of the Raspberry Pi Zero.
- Programmed and integrated wireless input system using Python to control prototype endoscope using Xbox joysticks
- Contacted vendors and performed physical testing to find kink-resistant sub 50 micron tubing for endoscope sheath.

Projects

Machine Learning Esports Prediction Model

May 2024 – October 2024

Collected data and trained neural network in Python to predict the outcome probabilities of any given game

- Built a scalable and robust web scraper using BS4 and Selenium to gather **8.6 million** data points over 5 year period
- Used industry insight to perform feature engineering along with implementing Trueskill ELO model for all teams
- Utilized neural networks, SVMs, and random forests to build and train the prediction model. Experimented with various machine learning frameworks such as TensorFlow, PyTorch, or Scikit-Learn
- Achieved an accuracy value of **68.4%** and a brier score of 0.177 giving a **0.72%** edge over leading sportsbooks
- Generated a return of **11.5% on an initial investment** of \$1000 over a 35 game period

Self Playing Piano

June 2022 – August 2024

Composed hardware and software to create autonomous piano system capable of playing **any** piece of music

- Individual control over all **88 keys** with **255** degrees of volume modulation using PWM to control solenoid array
- Wrote compact data transmission protocol (**4 bytes per note, 11520 bytes/sec**) to send information over USB serial
- Created static FEA simulation in SolidWorks to determine maximum deformation under weight of solenoids.
- Learned PCB design software EAGLE to control PCA9635 PWM chipset over **I2C**
- Documented the results on Youtube and provided assistance to other members attempting the same project

Skills

CAD: Fusion360, SolidWorks

Hardware: Arduino, Raspberry Pi

Programming: Python, Java, C#, MATLAB, C/C++

Sensors: Temperature, proximity, accelerometers, gyroscopes

Circuit Design & PCB Layout: KiCad, Altium, EasyEDA

Fabrication: 3-D Printing (FDM, SLA), CNC Machining, Lathe, Milling, Laser cutting, Soldering