Ashna Khemani

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Education

University of Pennsylvania — BSE in Mechanical Engineering & Minor in Economics, Class of 2026

Cumulative GPA: 3.96/4.0 | Dean's List May 2023

Current courses: Engineering Probability, Programming Languages, Dynamics, Thermodynamics, Partial Differential Equations.

Past courses: Linear Algebra, Intermediate Microeconomics, Statics & Strength of Materials, Thermal-Fluid Engineering, Mechanics, Electromagnetics, Mechanical Design, Writing.

Udemy — Machine Learning A-Z

Data analysis and prediction using regression, classification, NLP, reinforcement learning, and deep learning in Python and R.

Skills

- Machine learning, data analysis – Python (sklearn, numpy, Pandas, NLTK, TensorFlow, matplotlib), R (ggplot, caTools, SnowballC, cluster) and MatLab. [coursework on GitHub]
- Object-oriented programming in Python, Java, C/C++; using Git for version control.
- CAD, FEA, technical drawings, and fabrication (Solidworks, OnShape, laser cutting, 3D printing, silicone casting).
- Circuits (breadboards, soldering) and controls (Arduino Uno, Raspberry Pi, ESP32).
- Market research, product design, rapid prototyping.
- Technical documentation and presentations in MS Office and Notion.

Professional Experience

University of Pennsylvania GRASP Lab — Research Assistant (March 2023 – Present)

- Designing automatic data collection and analysis system to efficiently characterize 100+ soft robot membrane materials. Using Python (sklearn, numpy, etc.) for data analysis. Laser-cut and 3D-printed mechanism design.
- Redesigning lab's hexapedal and wheeled robots for lunar exploration as part of NASA's LuSTR project.

LCKR — Product Engineer, Market Researcher (May 2023 – August 2023)

- Spearheaded market research for startup using Natural Language Processing on 50,000+ group chat posts to determine primary product. Utilized NLTK package in Python.
- Designed initial product by setting technical requirements and creating CAD models.
- Accelerated beta launch by advertising and initiating partnerships with 10+ university facilities and student clubs.

Independent Research Project (August 2021 – June 2022)

- Published design of patient-operated physical therapy device in the *Journal of Student Research – High School Edition*. [*Design of a Physical Therapy Device for Lower Leg Recovery*]
- Created viable and cost-effective design in CAD using literature on biomechanics and existing technologies.

University of Southern California — SHINE Summer Researcher (June 2021 – August 2021)

- Developed algorithm to calculate optimized, conflict-free trajectories for multi-drone system with 30+ agents.
- Simulated results in Python. Presented and discussed findings at on-campus poster session with 200+ peers, professors, and graduate students present. [*MAPF and Trajectory Optimization with Drones*]

Leadership & Extracurriculars

Penn High-Powered Rocketry — Mechanical Lead (November 2022 – Present)

- Leading team of 30 students in development of 10,000-foot apogee rocket to compete in Spaceport America Cup. Coordinating across 7 subteams for design, documentation, and manufacture of 6-foot airframe.
- Optimizing rocket trajectory and aerodynamics with OpenRocket and Solidworks simulations.

VEX Robotics Team 2075A — Team Captain (August 2017 – May 2022)

- Led team of 4 to place in top 2% of teams worldwide for 5 years. Worlds Division Semifinalist in 2021. Coordinated design, build, presentation, and strategy in new competition challenge every year.
- Created PID loop to increase autonomous driving accuracy by 75% and shorten drive time by 30% by using sensor data (inertial, ultrasonic, quadrature encoders) in C++. [video]
- Designed and built mechanical subsystems (powertrains, 3600rpm flywheel, triple-length linkages) within competition-specified restrictions and limited team budget of $2,000.

Google x GirlPowered Robotics Workshops — Volunteer (June 2018 – July 2022)

- Promoted robotics among 3,000+ girls at workshop; presented on personal growth through competing.
- Provided hands-on experience for students by mentoring 20+ teams in building and coding robots for competition.

Projects: using computer vision to empirically prove physics equations, 3-Body Problem in MatLab, Convolutional Neural Networks in Python to classify flowers, CIFAR-10 and MNIST datasets using TensorFlow, CAD simulation of wind-up toy

Interests: autonomous systems, aerospace, data science, product design, economics, piano, live theater (as actor or audience)