Sampada Nepal

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EDUCATION

Massachusetts Institute of Technology Cambridge, MA
B.S. Mechanical Engineering & Robotics Aug 2024 – May 2028
Relevant Coursework: 18.03 Differential Equations, 2.001 Mechanics & Materials, 2.003 Dynamics, 2.086 Numerical Computation for Mechanical Engineers, 2.670 Mechanical Engineering Tools

EXPERIENCE

MIT LEAP Group | Undergraduate Researcher Sept. 2025 – Present

- Designed and integrated a ROS2-based teleoperation system for the Franka Emika robotic arm, coordinating mechanical, electrical, and software subsystems across a multidisciplinary team.
- Produced integration specs and validation test plans for simulation environment; performed root cause analysis and iterative design refinement on manipulation and collision avoidance behavior.
- Built an end-to-end Connect 4 game system pairing OpenCV board state recognition with autonomous pick-and-place manipulation for realtime human-robot gameplay.

PROJECTS

MIT WORMS – Androgynous Robotic Connector | Onshape, SolidWorks, 3D Printing, Machining

- Designed and prototyped an androgynous docking connector for the MIT WORMS modular lunar rover, defining interface geometry, DFM constraints, and GD&T tolerances for repeatable and autonomous mechanical engagement.
- Fabricated and tested physical prototypes via 3D printing and CNC machining, evaluating fit and failure modes; iterated designs to meet system-level assembly requirements.

Beverage Bot | Fusion360, Raspberry Pi, OpenCV, Python

- Designed and fabricated a flywheel-based electromechanical launch mechanism from scratch — achieving a 10-foot landing range.
- Integrated mechanical, electrical, and software subsystems into a single autonomous platform; developed sensor integration and real-time computer vision pipeline with full assembly and test documentation.

LEADERSHIP & ADDITIONAL EXPERIENCE

- **Team Lead, Human Technology Integration Club, MIT** (Fall 2025–Present): Leading mechanical and software development of an open-source hexapod robot; managing cross-functional integration of hardware, actuation, and RL-based locomotion control across a 10-person team.
- **Research Lead, SDSU Functional Carbohydrates Lab** (2022–2024): Materials science research with rigorous experimental documentation; Grand Prize SDSU Science Fair, presented at Regeneron ISEF.

TECHNICAL SKILLS

CAD & Design: Fusion360, Onshape, SolidWorks, assembly design, 2D drawings, GD&T, DFM/DFA
Fabrication & Testing: 3D Printing, CNC Machining, Laser Cutting, Manual Lathe, Soldering; prototype build and physical validation
Robotics & Control: ROS2, motion planning, inverse kinematics, Gazebo simulation, teleoperation, sensor integration
Programming: Python, MATLAB, C/C++, JavaScript
Perception: OpenCV, MediaPipe, real-time computer vision, Raspberry Pi