SHIVANK GUPTA

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EDUCATION

University of Pennsylvania, Philadelphia, PA — May 2026
Master of Science in Engineering, Robotics

Worcester Polytechnic Institute (WPI), Worcester, MA — May 2024
Bachelor of Science, Mechanical Engineering & Robotics Engineering (High Distinction)

EXPERIENCE

Penn Medicine

Research Engineer — June 2026 – Present

- Built end-to-end **multimodal pipeline** analyzing da Vinci Xi surgical video, combining world foundation models, VLM-based scene understanding, and kinematic cross-attention to extract structured signals from occluded, monocular, intraoperative video
- Post-trained **Cosmos** and EndoChat via **LoRA and RLHF** using surgeon-rated suturing quality as reward signal to generate suture-trajectory videos matching expert technique
- Trained and fine-tuned models using multi-GPU compute across PARCC HPC clusters (Slurm, partitions) managing experiment configuration across concurrent training runs

Graduate Research Assistant, PCASO Lab — Mar 2025 - May 2026

- Performed spatiotemporal analysis on monocular endoscopic video to obtain markerless needle pose estimation, derive camera extrinsics, identify suture events using depth and segmentation, and classify surgeon gestures
- Collaborated **directly with surgeons** to translate open-ended clinical questions into measurable ML metrics, iterating on model design based on domain-expert feedback
- Recognized with Penn's 2026 "Discovering the Future of AI" Award for applying AI to clinically actionable surgical insight

Molex, South Grafton, MA - Engineering Intern — May 2023 - Aug 2023

- Architected an automated testing system integrating sensing hardware and scalable data pipelines to process mechanical and electrical signal data, reducing testing time by **90%**
- Structured experimental data and analyzed complex process variables to support vendor specifications and **RCA**

Boston Scientific, Marlborough, MA - R&D Engineering Co-Op — Jul 2022 - Dec 2022

- Translated clinical needs into device requirements and experimental validation plans for **Class I/II endoscopic medical devices**; prototyped solutions using SolidWorks and DFM principles
- Authored technical design reports and test methods, navigating complex regulatory (**FDA 510(k)** and ISO 13485)
- Collaborated across quality, regulatory, and marketing teams to align engineering design with product strategy

PROJECTS

FINLEY: Open-Source Humanoid, WPI — Aug 2023 - May 2024

- Designed and deployed a 3D-printed humanoid platform for assistive healthcare using **physics-based digital twin simulation** (CoppeliaSim/MuJoCo) and resolving **sim-to-real** mobile manipulation divergence
- Implemented motion, path, and task planning via IK and **multi-sensor feedback** (IMU, LiDAR, RGB-D) in ROS
- Deployed on-board intelligence module enabling speech-to-motion execution, integrating custom C++ perception pipelines for autonomous navigation, pick-and-place, and unassisted walking

SKILLS

Robotics: ROS/ROS2, OpenCV, PyTorch, TensorFlow, Isaac Sim, MuJoCo, Gazebo, PyBullet, VLM
Programming: Python, C/C++, MATLAB, Git, Linux, CUDA, HPC
Hardware: SolidWorks [CSWA], AutoCAD, ANSYS, DFMA, PCB Design, 3D Printing

PUBLICATIONS

[1] **Gupta S,** Acker R, Lee S, Hsieh A, Daniilidis K, Jogan M, Hashimoto D. "AI Suture Analysis and Surgical Performance Evaluation in Robotic Pancreaticojejunostomy." *ACS Clinical Congress, 2026*