

Pranjal Bhatia

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EDUCATION

Purdue University | B.S. Mechanical Engineering; CS Minor; GPA: 3.70 May 2029 | West Lafayette, IN

- **Coursework:** CS 159 (C Programming), PHYS 172 (Modern Mechanics), MA 261 (Multivariate Calculus), ENGR 131/132, MFET 163 (Siemens NX, Teamcenter PDM, ECO Workflows)
- **Academic:** ICSE Board Exams – Top 5 worldwide (98.8%); Rank 1 globally in Mathematics, Chemistry, English Literature, History, and Computer Applications
- **Activities:** Baja SAE, IEEE Racing, Humanoid Robotics Club, Hack the Future @ Purdue, Squash (Purdue Traveling Team)

EXPERIENCE

Undergraduate Researcher | Convergence Design Lab, Purdue University (Prof. Karthik Ramani) May 2026 – Present | West Lafayette, IN

- Conducting research on natural language coordination protocols for multi-agent human-robot environments within the lab's Natural Language Environments (NLE) framework
- Investigating how instruction parsing degrades in spatially dynamic, multi-agent contexts and what fallback architectures are needed when semantic grounding fails in unstructured physical spaces
- Studying agentic AI interaction design for mixed reality applications, building on the lab's agentAR work on tool-augmented LLM agents supporting in-situ AR application creation
- Engaging directly with published lab research and PhD mentors to formalize open questions around autonomy layering, task coordination dominance, and human-robot interaction design

Undergraduate Researcher | Acoustic Metamaterials Lab, Purdue University (Prof. Junfei Li) May 2026 – Present | West Lafayette, IN

- Developing a tire-based acoustic energy harvesting system that captures vibrational and acoustic energy from rolling tires to power low-energy wireless sensors
- Targeting applications in tire pressure monitoring and road condition sensing; system designed around metamaterial-enhanced transducer architectures to maximize energy extraction across the acoustic frequency spectrum of a rolling tire
- Working through foundational literature on acoustic metamaterials, equivalent circuit modeling for piezoelectric harvesters, and energy harvesting circuit topologies; reading primary papers on sound field control and contactless acoustic manipulation
- Collaborating with a research partner covering PCB fabrication and energy harvesting IC integration; owning the mechanical design, transducer placement, and acoustic coupling side of the system

Summer Student Office Staff | University Residences, Purdue University May 2026 – Present | West Lafayette, IN

- Managing residential operations for summer conference programs – overseeing check-in/check-out logistics, room assignments, and key distribution for multi-group conference rotations
- Conducting nightly safety rounds and emergency response across assigned building zones; maintaining compliance with University Residences policies under on-call rotation requirements
- Delivering customer-facing support across multiple hall offices; handling sensitive participant data with confidentiality and professionalism across 20–40 hours per week
- Coordinating across program staff and coordinators to adapt operations in real time for schedule changes, last-minute group arrivals, and facility issues

Student Accessibility Support | Center for Instructional Excellence, Purdue University Mar 2026 – May 2026 | West Lafayette, IN

- Remediated 50+ course documents across 4 advanced STEM courses (CS 182, AAE 535, ECE 695, ME 620) to meet ADA Section 508 and WCAG accessibility standards
- Transformed complex technical content including engineering diagrams, mathematical notation, and code into fully accessible formats for students with visual, cognitive, and motor disabilities
- Contributed to Purdue CIE's university-wide ADA compliance initiative ahead of the April 2026 Department of Justice deadline, directly impacting hundreds of students in upper-division and graduate-level coursework

Developer | Hack the Future @ Purdue (~1.82% admit rate) Sep 2025 – Present | West Lafayette, IN

- Selected through competitive application to build production tools for underserved NGOs serving 2,000+ women globally
- Building full-stack applications using React, Node.js, and PostgreSQL; features include authentication, role-based access control, dashboards, and CSV export pipelines
- Shipping working features in 24–72 hour sprints; managing version control and collaborative code review through Git/GitHub
- Wrote Python data-processing scripts and OpenCV utilities for automated field data quality checks designed for low-connectivity environments
- Scoping requirements directly with NGO partners; translating non-technical needs into ticketed, testable user stories and delivering against them

Research Intern | American University Dubai

Mar 2024 – Dec 2024 | Dubai, UAE

- Prototyped VTOL drone airframe through multiple iterative FDM cycles; selected composite materials and performed structural analysis targeting thrust-to-weight optimization
- Designed modular motor mounts and landing gear assemblies for fast field swaps without tools; validated battery and propulsion sizing using first-principles power and load calculations
- Read and cross-referenced ESC, motor, and battery datasheets to verify electrical compatibility before integration
- Wired and bench-tested full propulsion stack; recorded test results and failure modes before advancing to flight validation
- Maintained design iteration logs and documented material selection rationale to support reproducible research across the team

Co-Founder & COO | Alumnaut

Oct 2023 – Jun 2025 | Dubai, UAE

- Co-founded student-alumni mentorship platform from scratch; built and led 25-person team across product, engineering, marketing, and operations
- Scaled to 700+ students, 400+ alumni, 15+ schools, and 5,000+ total users; achieved AED 15k+ revenue and secured legal business license
- Built matching algorithm from scratch improving mentor-student pairing quality; designed dynamic pricing model and closed paid pilots within two weeks of launch
- Conducted 300+ user interviews to validate product-market fit; iterated onboarding flows and cohort systems to achieve 60% program completion rate
- Won \$750 US accelerator scholarship; pitched to investors, school administrators, and institutional partners across UAE and India
- Returned to the competition where the startup began one year later – as a judge

Esports Operations Lead | Discord – MENA Region

2022 – 2024 | Dubai, UAE

- Organized and operated 70+ esports events across the MENA region with 10,000+ total participants across multiple game titles and formats
- Managed a 50-person operations team spanning event scheduling, broadcast production, referee coordination, and on-ground logistics
- Built standardized run-of-show templates, rulebooks, and ops playbooks reused across events; reduced per-event setup time significantly
- Handled real-time incident management during live events including technical failures, disputes, and last-minute schedule changes
- Coordinated with sponsors, venue partners, and broadcast teams; maintained relationships across a 2-year event calendar

PROJECTS**Candid (trashmy.tech)** | *1st Place JHMC Ideathon (\$1,000), Hon. Mention HackIllinois 2026* | [Live](#) | [Devpost](#) 2026

- Built solo at HackIllinois after team dropped out 15 hours in; deployed 50 concurrent Playwright browser agents on Modal, each simulating a different user type with custom viewport, accessibility settings, and behavioral script
- Full 50-agent test completes in under 60 seconds via true parallelism; engineered `smart_click` with 12 fallback strategies and a UX-vs-tool failure classifier so scores reflect real user experience, not automation limits
- Integrated axe-core (WCAG), Lighthouse (performance), and a custom AI SEO auditor checking robots.txt against 12 AI crawlers (GPTBot, ClaudeBot, etc.), llms.txt presence, and content extractability for ChatGPT, Claude, and Perplexity
- Gemini 2.5 Pro synthesizes findings across all 50 sessions into narrative reports; Supermemory indexes results by industry so each subsequent audit is smarter than the last
- Reports deliver annotated screenshots with exact failure locations, ranked fix list by impact, and a one-click LLM prompt for immediate code-level solutions
- Pivoted into Candid at JHMC Ideathon: defined ICP, JTBD framing, pricing (\$19/test, \$99/mo), and competitive positioning; placed 1st out of all teams, winning \$1,000

ChYme | *Most Creative – StarkHacks 2026 – World's Largest Hardware Hackathon*

2026

- Built a wearable swallow-detection and reminder device for Parkinson's patients with dysphagia as embedded hardware lead
- Designed full power circuit from scratch: TP4056 LiPo charger, MT3608 boost converter, and LiPo cell; handled all I2C wiring and physical mounting of dual MPU-6050 accelerometers
- Wrote STM32 ring buffer firmware to stream sensor data into an on-device CNN classifier trained via Edge Impulse; achieved 93% accuracy running on Arduino Uno Q
- Won Most Creative out of the entire field at StarkHacks 2026

R2Z – Race to Zero | *Two-Phase Immersion Cooling Research, Purdue VIP Program*

2025 – Present

- Contributing to two-phase immersion cooling research as part of Purdue's Vertically Integrated Projects (VIP) program under the Race to Zero team
- Presented research findings at a Purdue campus expo; communicated thermal management concepts and experimental results to a mixed technical and non-technical audience
- Supporting experimental design, data collection, and iteration on cooling system performance under varying thermal load conditions

Polymer | *Top 5 NexHacks (1,500+ participants)* | [Devpost](#)

2025

- Built a conditional trade execution engine for Polymarket: users define rules like “if event A resolves true, execute trade B” and the system handles it automatically with sub-50ms detection latency
- Added a LiveKit real-time voice agent that surfaces relevant news context and challenges assumptions before any trade fires, reducing impulsive decisions

- Built Gemini-powered news ingestion pipeline to keep market context current; integrated Web3.js for on-chain execution
- A few weeks after building, Kalshi shipped the same conditional execution feature commercially; Polymarket still has not – we identified and built the right answer before the market caught up
- Stack: Next.js, Polymarket API, LiveKit, Gemini, Web3.js, Python

HERizon | *1st Place InnovateHer 2026 (50+ teams)* | [Live](#) | [Devpost](#)

2026

- Built a gamified platform to expose young women to STEM careers through interactive simulations, 10 global pioneer profiles, 3 career labs, and a future letter system
- Full-stack: Next.js, TypeScript, MongoDB; integrated Claude API for personalized, dynamic mentorship responses for each user path
- Designed zero-pressure branching UI so exploration felt like a game; built role-based career paths with confidence-building practice loops
- Led a 4-person team through a 36-hour hackathon; owned architecture, REST API design, database schema, Vercel deployment, and final demo pitch
- Won 1st place out of 50+ teams; platform remains live and continues to receive traffic

StickX – Smart Assistive Cane | *Manipal Academy*

2024

- Designed and built an assistive walking cane for a visually impaired neighbor, Mr. Gopal, who wanted to walk independently again – started with a problem and a person, not a brief
- Fabricated casing from recycled carbon fiber and hemp resin composite; salvaged gyroscope from an old smartphone and motor from a toy car to minimize cost and weight
- Wired ultrasonic and IR sensors to Arduino microcontroller; wrote proximity detection and obstacle classification firmware from scratch
- Prototyped custom PCB for sensor power distribution and signal routing; tuned vibration feedback patterns through repeated blindfolded hallway testing
- Iterated four physical prototypes before reaching a version reliable enough to hand to someone who depended on it; Mr. Gopal walked unassisted with the final version

Stay On Specs | *Won \$600 at PESC 2025*

2025

- Built an ML tool that flags hardware spec violations in real time during engineering design reviews, before parts go to fabrication
- Trained a scikit-learn classifier on labeled component spec datasets to detect tolerance deviations and parameter mismatches
- Integrated the pipeline into existing design workflows so violations surface automatically during the review process without a separate audit step
- Reduced manual review overhead and caught errors that would have been expensive to fix post-fabrication; won \$600 at PESC 2025

A.I.D.E. | *4th Place Purdue Hello World Hackathon 2025* | [Devpost](#)

2025

- Built a VS Code and Chrome extension that detects paste events via the VS Code API and immediately generates a targeted quiz and explanation for the pasted code
- Forces developers to engage with what they copied before moving on – turns passive vibe-coding into active understanding
- Owned end-to-end: HCI user flows, UX prototyping, paste detection logic, async quiz generation backend, and response logging
- Stack: JavaScript, Node.js, VS Code Extension API, OpenAI API

LEADERSHIP & COMMUNITY

Founder | Quantum Quorum – UAE's First Student STEM Symposium

2023 | Dubai, UAE

- Founded UAE's first high school STEM symposium after noticing that curious but quiet students had no real forum to share ideas outside their own classrooms
- Recruited and coordinated a 30-person organizing team with no prior event infrastructure; handled venue, scheduling, speaker outreach, and participant comms from scratch
- Invited schools from across the UAE; 100+ students attended, 60% of whom had never participated in an external event before
- Created structured discussion formats so participants who had never spoken publicly could engage – several went on to lead their own initiatives the following year
- Personally recruited hesitant participants including close friends; used the event to model the kind of intellectual openness the symposium was built to create

Organizer | TEDxYouth Dubai

2022 – 2023 | Dubai, UAE

- Served on core organizing committee for TEDxYouth Dubai; coordinated run-of-show materials, speaker prep logistics, and cross-team communications
- Managed day-of execution across a multi-stage event; maintained schedule accuracy and resolved real-time issues during live program
- Contributed to speaker curation and briefing process; ensured talk structure and content met TEDx guidelines and time constraints
- Gained firsthand experience running high-stakes public events and working under a team with strict quality and brand standards

Volunteer Teacher | Tender Hearts Arena

2021 – 2023 | Dubai, UAE

- Volunteered 100+ hours teaching art and basic Punjabi to children with special needs at Tender Hearts Arena, Dubai
- Developed multi-sensory lesson structures adapted to different learning abilities and attention spans
- Taught 4th and 5th graders to count in Punjabi using push-up counting and movement-based memory techniques
- Secured \$10,000 in CSR funding by building a proposal and presenting to corporate sponsors

President & COO | Hayat Khadra Sustainability Drive

Dec 2023 – Present | Dubai, UAE

- Led student-run recycling initiative that collected 7+ tons of recyclables in 10 days across multiple Dubai schools
- Wrote full operational SOPs covering weigh-in, sorting, box labeling, and pickup coordination; SOPs cut setup time by 60% and allowed new volunteer teams to run drives independently
- Managed a logistics crisis the night before prize day when 5 tons were found unsorted at the school gate with an event the next morning – called 10 volunteers and 7 NGOs, built a real-time zone system on the phone, sealed 110 boxes by afternoon
- Coordinated waste pickup across 4 NGO partners and 3 schools with no dedicated budget; built WhatsApp templates and truck routing to keep operations moving
- Created leaderboard and school shoutout system to drive student participation; sustained daily engagement across a 10-day drive

Drummer | School Marching Band

2016 – 2022 | Dubai, UAE

- Performed as drummer in school marching band for 6 years; performed for audiences of up to 600 people across school events and public performances
- Developed discipline of sustained rehearsal and physical precision under performance pressure across a consistent 6-year commitment
- Coordinated timing with a full ensemble; learned to hold structure independently while staying responsive to the group

ENGINEERING CLUBS**Mechanical Sub-team** | Purdue Humanoid Robotics Club

Sep 2025 – Present | West Lafayette, IN

- Designing 6 DOF robot arm and hand in SolidWorks with modular finger and thumb subassemblies for independent bench testing
- Replaced tendon-based actuation with rigid mechanical linkages; integrated linear actuators and servos for flexion and abduction, reducing actuator count and improving failure predictability
- Designed flat-profile finger geometry as machining fallback for FDM tolerance failures; co-designed sensor mount geometry with electrical sub-team for clean integration
- Supported control bring-up and maintained experiment logs so hardware progress remained reproducible across team members

Mechanical Team Member | Purdue IEEE Racing

Sep 2025 – Present | West Lafayette, IN

- Designed and iterated sensor mounts in Fusion 360 and Siemens NX; reduced part count 15% through DFM analysis and tolerance stack-up review
- Implemented Arduino PID control loop for drivetrain motors; tuned P, I, D gains through iterative bench and track testing to reduce overshoot and improve transient response
- Integrated encoder feedback and wired sensor harness; validated signal integrity and debounce behavior under vibration load

Mechanical Team Member | Purdue Baja SAE

Jan 2026 – Present | West Lafayette, IN

- Designing suspension and drivetrain sub-systems for a single-seat off-road competition vehicle in SolidWorks under SAE load cases
- Performing GD&T and weldment analysis on tubular steel frame joints; applying DFM principles for sheet metal brackets and machined drivetrain components
- Running stress analysis at joint interfaces; iterating geometry to meet safety factor requirements within weight budget

TECHNICAL SKILLS**Languages:** Python, C, Java, JavaScript/TypeScript, SQL**Frameworks & Databases:** React, Node.js, Next.js, FastAPI, Express, MongoDB, PostgreSQL, Web3.js**AI/ML & Tools:** Claude/Gemini/GPT APIs, Playwright, axe-core, Lighthouse, OpenCV, scikit-learn, Supermemory, Modal**Infra & Dev:** WebSockets, Git/GitHub, Vercel, Arduino, STM32, Edge Impulse, VS Code API, PCB Prototyping**Mechanical Design:** SolidWorks, Fusion 360, Siemens NX, Teamcenter PDM/PLM, GD&T, DFM/DFA, Tolerance Stack-up, FDM Prototyping, PID Control, Weldment Analysis