Harsh Mathur

Duke University, Durham NC
+1 (984) 312 9842 | harsh.mathur@duke.edu | harshmathur.com

A tinkering enthusiast seeking to develop a culmination of skills in research and industry, all the while interrogating the workings of the world

EDUCATION

Duke University – Pratt School of Engineering | GPA: 3.890 **(2022-2026)**

- Mechanical Engineering – Aerospace Certificate (BSc); Computer Science (BA)
  - Mechatronics EGR224 - electrical components, sensing, and information processing, circuit/system response analysis
  - Solid Mechanics & Dynamics EGR201/44 - Analysis of force systems/dynamics of particles, rigid bodies, and nonrigid systems
  - Computer Architecture **CS250** - computer structure, machine language & instruction execution
  - Data Structures & Algorithms CS201 - lists, trees, sets, tables/maps, graphs, abstraction and implementation

TECHNICAL SKILLS

Skills - Mechanical Design - CAD: Solidworks, Ansys (Fluent), Fusion 360, Autodesk Suite, VR/XR: GMetri Engine, Unity
Embedded Systems: C/C++, MIPS Assembly; Processes: Java, Python, R; Full-Stack Web Dev: React.js/MERN Stack, Figma

RELEVANT EXPERIENCE

- **Undergraduate Laboratory Assistant – Soft Robotics Lab | Pratt Engineering** **(2023-Present)**
  - Developed methods of fabrication of liquid matter channels embedded in stretchable polymers for soft robotics
  - Designed linear actuation machine utilising CAD, programmably actuated via arduino embedded system
  - Awarded $2,000 Instrumentation Facility Grant for the study of the conductive constraints of liquid conductors (EGaIn)
- **Quality Control Manager, Nyawoluhle Bridge – Engineers in Action (DukeEngage)** **(Summer, 2023)**
  - Constructed and oversaw construction of the **longest suspended bridge** (122.2 metres) in Eswatini, Africa
  - Assisted in the dimensioning, surveying and technical design of structural components
  - Developed material flow strategies and methods of construction of masonry and foundation structures
- **Independent Aerodynamics Research – Turbulence Reduction/Wind Tunnel Design** **(2019-2023)**
  - Developed the Windtunnel Project, a free repository of building plans for an open-circuit test apparatus for aerodynamics
  - Prototyped blowing and suction wing-jet nozzle prototype, demonstrated flow optimisation by 15-20%
  - Collaborated with India's finest research institution – IISc, Bangalore on analysis, application, research methodology
  - Received international recognition by the **Society for Science** for resultant wing optimisation
- **Mechanical Engineer – Duke Electric Vehicles/Duke Hyperloop** **(2022-Present)**
  - Designed low-cost suspension developed for energy optimisation in turning radii; participated at the Eco Shell Marathon
  - Fabricated the electronic components of the acceleration module in a tri-control mechanism for optimised energy flow
  - Developed CAD drawings, friction testing apparatus, and control system for flywheel braking mechanism

INFORMATION TECHNOLOGY EXPERIENCE

- **Backend Developer, Materials Data Repository MATD^3 | Duke Ab Initio Materials Simulations** **(2023-Present)**
  - Developed optimization protocols in the open source MATD^3 directory, an **NSF-DMREF** funded project
  - Refactored installation code and starter configuration file for installation streamlining, boosting collaboration potential
  - Awarded the maintenance position of the open source project assisting the growth, outreach, and accessibility of development
- **Design & Front-End Lead, Epicenter - Education AI Product** **(2022-Present)**
  - Established development of a front-end engine wired to an indigenously engineered Large Language Model (LLM)
  - Led design of product, customer journey maps, interface, and prototyped output analytics UI design systems in MERN.js
  - Calibrated optimized API-Protocol wiring generative content stream to front end interfaces in low render time
- **User Experience Engineer, GMetri XR (gmetri.com)** **(Gap Year, 2020-2021)**
  - Ideated, programmed, and deployed VR modules for multinational companies' engagement exercises – **Paypal, Accenture**, etc.
  - Developed data-driven design for VR-retail experiences for clients, including renowned fashion designer Manish Malhotra
  - Designed innovative VR integration boosting engagement rates by 2x-3x directly handled projects worth ~$38,000

HONOURS & AWARDS

- Awarded Duke Mechanical Engineering SMIF Innovation Grant for Material Science Research in Soft Robotics **(2024)**
- Appointed Engineering Student Government's Director of Tech - Developing web facilities for Pratt's Student Body **(2024)**
- Shortlisted for MIT Climate and Energy Prize, 2023; selected for presentation from a pool of 100+ startups **(2023)**
- Awarded the Bee-Keng Scholarship at Duke University's Pratt School of Engineering amount $300,000 over four years **(2022)**
- Top 20 Projects among 1000+ submissions; received India's only Mechanical Grand-Award-IRIS; Team India – ISEF **(2020)**

ACADEMIC PUBLICATION

Mathur, Harsh. "Low-Cost Method Qualitatively Verifying the Role of Blowing Jets in Improving Airflow across Airfoils Experiencing Flow Separation." *Journal of Emerging Technologies and Innovative Research* 8, no. 12 (December 31, 2021): 48–53.