Lohit Balakumar

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EDUCATION

Vanderbilt University **Nashville, TN | May 2025**
B.E. Mechanical Engineering with Material Science and Digital Fabrication Minor
GPA: 3.62

PROFESSIONAL EXPERIENCE

Copeland | Additive Manufacturing Co-op **Sidney, OH | May 2024 – Aug 2024**

- Printed 350+ parts for R&D department using FDM and metal printing technologies
- Designed and printed components using Siemens NX for upcoming compressor models
- Utilized 3D scanner to analyze parts for manufacturing deviancy and reverse engineering in Polyworks
- Implemented company wide order-management software to streamline and document 3D print orders.

Wilson Sporting Goods Inc. | R&D Engineering Co-op **Roseville, CA | Jun 2023 - Dec 2023**

- Addressed return issue costing $400,000 in lost revenue by designing and machining a testing fixture to consistently measure all bat knob model's strength and durability
- Revitalized old drop tester by machining mount to straighten guide rods and cut testing time by 50%
- Designed and prototyped new end caps and knobs for 2025 bat models and incorporated player feedback
- Researched 3D scanners, mesh modeling softwares, and documented standard protocol to reverse engineer wood bats in MLB clubhouses within 50 MOI points (.5%)
- Quantified bat joint stiffnesses utilizing baseball cannons and analyzing shock sensor data with MATLAB
- Utilized SLA 3D printer to prototype handle tapers and fabricate silicon countermolds

Vanderbilt Miniature Robotics Lab | Undergraduate Researcher **Nashville, TN | Jan 2023 - May 2023**

- Fabricated millimeter sized robots with Polydimethylsiloxane (PDMS) and Ecoflex to conduct experiments
- Collected data in controlled biological environments to characterize adhesion force and viscosity for application in colonoscopies
- Automated testing setup by shifting to an Arduino controlled stepper motor to accurately collect data

GMU Advanced Materials & Manufacturing Lab | Research Intern **Manassas, VA | June 2022 - Aug 2022**

- Oversaw fabrication novel composite consisting of thermoplastic polyurethane (TPU), zylon (PBO), and carbon fiber (CF), for boot outsoles to increase slip-resistance against ice
- Utilized injection molder to convert a mixture of lab's novel composite into sample plugs for testing
- Prepared 150+ samples for Scanning Electron Microscopy (SEM) imaging by conducting abrasion tests and calculating Abrasion Resistance Index using Excel
- Researched and developed mixing methods to increase production yield by 15%

PROJECT EXPERIENCE

Vanderbilt Robotics Team | Frame & Drive Engineer **Aug 2022 – May 2023**

- Developed CAD models and assembly of drive system for NASA Lunabotics Competition in Solidworks
- Fabricated motor plate to reduce mass by 20% and integrated dynamic tensioning system with CNC Mill
- Analyzed weak points of motor plate using finite element analysis and optimized design to prevent warping
- Modeled and prototyped motorized gimbal system for LIDAR for optimal data acquisition

PUBLICATIONS

- Xu, Y., Xiao, B., Balakumar, L., Obstein, K. L., & Dong, X. (2023). Wireless Millimeter-Size Soft Climbing Robots With Omnidirectional Steerability on Tissue Surfaces. *IEEE Robotics and Automation Letters*, 8(9), 5720-5726. doi: 10.1109/LRA.2023.3300570.
- Xiao, B., Xu, Y., Edwards, S., Balakumar, L., & Dong, X. (2024). Sensing Mucus Physiological Property In Situ by Wireless Millimeter-Scale Soft Robots. *Advanced Functional Materials*, 34, 2307751. doi: 10.1002/adfm.202307751.

SKILLS

Design Programs: Solidworks (CWSA), Fusion 360, Onshape, Creo, AutoCAD, ANSYS
Programming Skills: Java, Python, Javascript, HTML/CSS, Microsoft Excel, Arduino, MATLAB
Prototyping Skills: 3-D printing, Injection molding, DFM, Machining, CNC Mill, FEA, Laser Cutting, GD&T
Relevant Coursework: Statics, Thermodynamics, Dynamics, Circuits, Mechanics of Materials, Differential Equations, Linear Algebra, Material Science, Fluid Mechanics, Mechatronics