Ethan Sanches

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University of Southern California – Master of Science in Mechanical Engineering | GPA: 3.76/4

Dean's Master's Scholarship

Clubs: 3D4E (3D for Everyone) – Air-Powered Rocket, 5 DoF Robotic Arm, Laboratory Technician; Dr. Bo Jin Composites (CFRP) Lab Researcher Relevant Coursework: Additive Manufacturing, DFMA, Advanced Mechanical Design, Design and Advanced Manufacturing of Machine Components, Foundations of Manufacturing Automation. Computational Design of Machine Components, Material Selection

Goa College of Engineering – Bachelor of Engineering in Mechanical Engineering | GPA: 3.64/4

Relevant Coursework: Mechanics of Solids, Manufacturing Technology I&II, CAD&FEA, RAC, Applied Thermodynamics I&II, CIMS, Machine Design I&II, Mechatronics, Analysis and Synthesis of Mechanisms and, Material Science and Metallurgy, GD&T, Process Quality and Reliability

SKILLS

SolidWorks: 3D CAD, Flow Sim, Motion Analysis, FEA | Fusion 360: 3D CAD, FEA, Motion Analysis, Animation, Functionality Test | Siemens NX: 3D CAD, FEA | Ansys: Fluent, Mechanical (FEA), Workbench, CFX, 6DOF, Granta | XFlow: Transient and steady state, lift, drag | Altair; Casting, Topology optimization, Structural | Material Selection | Microsoft Office | MATLAB | Python | New Product Development | Rapid Prototyping | 3D Printing: PLA, ABS, Setting up, Troubleshooting | Car Design Sketching | KeyShot3D | Gantt Chart | DFMEA | Design of Experiments: ANOVA, T-Test, Regression | BOM | FEA | CFD | Mechanical Design | DFMA | Robot Selection: IK, FK, cost estimation, path planning, obstacle avoidance | CFRP: hands-on design and Manufacturing (layups, vacuum infusion) | GD&T: Tolerance stack up | MSA: Gauge R&R | Machining: Lathe

WORK EXPERIENCE

1echanical Engineering Intern – Proper Voltage, Carlsbad, CA	
•	esigned and prototyped 4 battery and electronic enclosures by using 3D modelling, tolerance analysis, 3D scannin

- Formulating a push-button locking mechanism for the Shark Ninja Prototype Enclosure using statics and FBD
- Selecting and buying mechanical components from McMaster Carr (springs, bolts, heat inserts) based on design and calculations
- Created 3 Power Supply enclosures for the battery packs complimenting the battery pack enclosures

Mechanical Design Intern - Entitle Media (FoodEase) (NDA), Euclid, OH

- Devised 6 iterative prototypes of a self-cooking robot after reviewing 65+ customer responses in a team of 3 (on Kickstarter) .
- Bettered prototype's functionality and ergonomics utilizing motion analysis in Fusion 360 •
- Researched on 3 food-safe materials and 2 manufacturing processes for mass-producing automatic cooking robot

Mechanical Research and Development Intern - Tuff Robotics, Bangalore, India

- Developed 11-link wired mechanical Snake Robot allowing for 3 different types of gaits, i.e., Serpentine, Concertina, Side Winding
- Researched and built an Ornithopter in Fusion 360 having a gross weight of 1.2kg (2.6 Pound)
- Performed CFD analysis in XFlow and Ansys; gained a lower Drag Coeff (0.23), higher Tail Force Couple about CG (Roll/Pitch), and Lift by altering ornithopters' body dimensions and shape

Product Development Intern - Dichroic Labs LLP (NDA), Bangalore, India

- Drove the Mechanical, Electrical, and Electronics aspects of design of the Self Leveling Platform in a team of 5
 - Lowered number of supporting members bearing 30T required for leveling platform prototype from 8 to 4, thereby reducing fabrication and raw material costs by 50%
- Drafted Engineering drawings and BOM to estimate total costs of entire project and worked closely with hardware and raw material manufacturers and fabricators

PROJECTS

Robot Manipulation and Equipment Selection (AME 547)

- Aug 2023-Dec 2023 Designed a custom gripper and selected a commercial robot to Pick and Place 1000lb of Rock Wool for an undisclosed company
- Calculated the required IK & FK for the robot to detect, carry, and place the bale onto the pellet.
- Conducted FEA & calculated the static forces on the gripper, to make sure it is safe to carry the heavy bales of rock wool with a FOS of 1.5 **Adjustable Headphone Cushion** Jan 2023-May 2023
 - Sketched, Modelled, designed a headphone with ear shape-forming cushion to alleviate ear cartilage aches over prolonged usage
 - Utilized hardware design methodologies and customer reviews to create morphology, functional charts, feasibility calc. and ethnography
 - Used a simple, effective, human feedback mechanical cam system for the desired control of the cushion after 4 prototype designs Jan 2023-May 2023

DFMA Analysis – Brute Bin

- Identified material and manufacturing processes used to produce the bin by utilizing DFMA rules and guidelines
- 3D modeled the Bin to get the actual volume and overall dimensions of the bin and calculations required for injection molding
- Assumed 200,000 units to be manufactured and calculated the estimated tooling, processing, and manufacturing costs
- Calculated and compared Manufacturing cost \$12.71 to the actual price of the Bin \$40. Reduced overall price by 10%(Total= \$36) Aug 2019-Sep 2021

Faircon (Bachelor Degree Thesis/Project, Applying for Patent)

- An amalgamation of a ceiling fan and an AC into 1, without use of Refrigerants
- Cut off unsprung mass (61%) from Power Ring using Topology Optimization, keeping component's stiffness same
- Achieved average speed of air within a room at 1.9 m/s (turbulent) as opposed to 0.4 m/s with conventional ceiling fans

Magnetic Refrigeration (Research, Design, Applying for Patent)

Designed and implemented a dynamic rotating module for housing Gadolinium (Gd) material in Faircon's cooling system, resulting in a 40% increase in cooling efficiency and a 25% reduction in energy consumption Dec 2017-Mar 2018

Rope Twisting Machine (Diploma Final Project, Best Project Award)

Engineered a state-of-the-art rope manufacturing machine that recycles 100+ pounds of thin agricultural waste fibers daily; enabled both manual and automated operations, enhancing production efficiency by 40% while minimizing environmental impact

g and 3D printing

Apr 2022-Jun 2022

Mar 2022-Jun 2022

Jun 2023-Aug 2023

Mar 2022-Jun 2022

Oct 2019-Nov 2019

Aug 2022-May 2024

Jun 2018-Jul 2021