

# Alanna Manfredini, CMus.A, ATCL

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## Education

**Duke University, USA** BS. Mechanical Engineering & Materials Science expected '24  
Minor in Machine Learning and Artificial Intelligence **GPA: 3.79**

**Duke SPIRE Fellow** One of 20 STEM students selected for mentoring and unique networking opportunities

**Apple inc. AWSEM** Selected for Apple Inc.'s mentoring program for women in science, engineering, and math

**Selected Presenter** Researched Social Media Addiction for 12th Annual Constructal Law Conference, Turin, Italy

**Relevant Coursework: Fluids; Thermodynamics; Controls; Machine Learning; Material Science; Diff Eq; Dynamics; Mecha-**  
**tronics; ME Analysis; Algorithms and Data Structures; Statics; Linear Algebra; Constructal Physics;**

## Work Experience

**Software Engineer** Protect3D Aug '23 – Pres  
• Reduced data processing time by 10 minutes, by automating with a Neural Network pointcloud classification algorithm

**Intern** Tesla Motors Material Flow Team May '23 – Aug '23  
• Reduced design time from >3 weeks to 1 minute and eliminated all initial vendor costs with python autogenerating CAD  
• Designed cleaning equipment to automatically clean ASRS racking and maintain ISO cleanroom standard  
• Prevented \$1000s of part damage by determining coefficient of friction on forks from first principles and FEA  
• Managed million dollar installation by coordinating vendors & construction teams, and doing vehicle tracking simulations

**Intern** Aptera Motors' Solar Team May '22 – Feb '23.  
• Negotiated \$200,000 in cost savings for AGVs and conveyance systems using first principles costing approach  
• Reduced floor space & cycle time by 50% by creating line layout that included buffers, rework and quality stations  
• Led team of vendors to design an automated Pick'n'Place/soldering gantry from SOW through conceptualisation  
• Improved OEE by running testing during FAT and developing controls plan to ensure quality and for future MES part tracking

**Lead Engineer** LowCostomy Bag Aug '20 – Aug '22  
• Reduced the price of a colostomy bag by 95% for low income countries by designing with entirely recycled materials  
• Won \$28,750 from NIH to support current IRB testing and subsequent manufacturing  
• Managed team to develop a design manufacturable locally in Tanzania by balancing labour and machinery costs  
• Performed qualitative and quantitative tests on material properties to improve longevity and reduce skin irritation

**Intern** Tiller Design Jun – Jul '21  
• Improved plumbers' labour time by 75% by designing attachment for nail gun to automatically fasten clips on nail  
• Sourced low cost stands able to withstand forces from rough, everyday use of a MRI brain scanning device  
• Created designs and concepts to improve profits of Defense Force "Kord" tool and branch into the consumer market

**Designer** Emona Instruments Dec '20 – Jan '21  
• Designed optics plug removal tool for manufacturing using injection moulding and casting to improve ergonomics

**Teaching Assistant** Applied Eng; Intro to ME; Design Communication Aug '21 – Pres  
• Lectured and led labs on circuitry, design, CAD, robotics, manufacturing, Arduino, prototyping and presentation

## Design and Leadership Experience

**Engineer** Pinball Machine Independent project Aug '22 – Pres.  
• Designed and fabricated pinball machine. Sourced appropriate components based off force models and material properties  
• Experimented with designing a solenoid to better handle abrupt voltage changes due to pulse width modulation  
• Wrote state machine code for Arduino to efficiently actuate mechanical systems from sensor inputs

**Chassis Designer** Duke Motorsports Mar '21 – Dec '22  
• Produced FMEA for car during race and transport  
• Designed testing rig for car chassis to ensure it can withstand torsion from suspension at 80mph  
• Reduced pit-stop maintenance time by 75% by designing and fabricating cheap and durable jigs

**Lead Engineer - Winner of ASME Creativity Award** Shutters of Life Apr '22  
• Created a window shutter planter with self watering system and a cantilever able to elegantly support soil and water  
• Coordinated team to make force models to inform designs with minimal stress in weaker joints

**Mentor** Cupertino Technology High School Technovation Nov '20 – Apr '21  
• Mentored students to develop an app and market it to mock investors  
• Taught coding and presentation skills

**Technical Skills: Solidworks, AutoCad, Navisworks, Java, Python, C, VBA, FEA, CFD, Fusion360, Maple, FANUC**

**Interests: Rock climbing, Piano, Cello, Singing, Theatre, Dance, Surfing, Art, Parametric Design, BioMimicry**