Evan Bosia

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Skills

Engineering: Mechanical Engineering, System Modeling, Circuit Design, Embedded, CAM
Programming: (*proficient*): Python, C#, C, Java (*familiar*): MATLAB & Simulink, ROS, Git, C++
Applications: SolidWorks, Onshape, ImageJ, OneCNC, Git
Manufacturing: CNC Machining, Lathe, Soldering, 3D printing, Laser Cutter
Leadership: Customer Service, verbal and written communication, problem-solving, creativity

Experience

R&D Mechanical Engineer, Formulatrix, August 2017 - Present

- Collaborated in the development of Constellation dPCR system, which was sold for $260 million to Qiagen
- Lead support engineer for the Constellation instrument, including customer site visits
- Expedited plate production rate and quality by automating the rate-limiting step in plate assembly
- Developed Python scripts to improve data analysis for debugging and support purposes

Projects

Dust detection, Formulatrix

- Created an algorithm to identify and quantify dust particles on Constellation microplates
- Wrote an image labeling program in C# to generate score data for “dustiness” of plates
- Developed a machine-learning algorithm to predict dust scores using the results from the labeling program
- *Utilized:* Python, C#, OpenCV, Git, Pandas, jupyter, scikit-learn

Plate Poker, Formulatrix

- Increased plate perforation rate by 500% through automation
- Programmed a windows form application using C# and OpenCV to determine target locations
- Improved usability by allowing the user to edit XML configuration files in the application
- Led a training for the production team in Indonesia on the operation of the plate poker
- *Utilized:* C#, soldering, OpenCV, XML, Git

dPCR Report Generator, Formulatrix

- Enhanced plate QC tracking by writing C# program to automatically create reports from result data
- Programmed dynamic handling of different types of results and plate formats for PDF output
- *Utilized:* C#, XML, Git

Log Parse Programs, Formulatrix

- Improved effectiveness of support role by writing scripts to parse and analyze Constellation error logs
- Programmed script to parse, graph, and characterize temperature readings from the thermal cycling modules
- Other scripts include error tracker, readable log creator
- *Utilized:* Python, knowledge of controls

Plate Shrinkage Analysis, Formulatrix

- Developed a Python program to find and sort backlit port locations on microplate using OpenCV
- Calculated plate shrinkage from the csv results data from each image using a Python script
- Output plate shrinkage heat maps to show the areas of most extreme shrinkage
- *Utilized:* Python, OpenCV, Pandas

Surface Temperature Measurement, Formulatrix
- Machined delrin plate with thermistors to measure temperature uniformity of thermal cycler
- Converted Arduino analog values into temperatures using Python script
- Read FLIR temperature values from thermal image pixel intensities using Python script
- Used repurposed arduino+circuit into a temperature measuring tool for measuring enclosure temperature
- *Utilized:* Python, Arduino C, circuit design, OpenCV, OneCNC, CNC Milling

Constellation V2.1, Formulatrix
- Worked with Indonesian engineers to add incremental design changes to the Constellation
- Used support experience to identify problem areas with the instrument
- Topics of interest included serviceability, ease of assembly, use of sheet metal
- Analyzed proposed design changes from Indonesia and provided feedback
- *Utilized:* SolidWorks

NHL Machine Learning, personal
- Wrote Python script to download NHL statistics and player data from NHL API
- Developed machine learning model to predict year cumulative statistics
- *Utilized:* Python, Jupyter, Git, Pandas, scikit-learn, requests, NHL API

Drone Delivery of Vaccines MQP, WPI
- Built temperature-controlled package for vaccine transportation via drone
- Optimized the volume, weight, and thermal properties of the package using a thermodynamic model in MATLAB
- Developed in-depth Simulink model to accurately predict the system response given different control methods
- Created electronics setup to autonomously update temperature, send status updates, control simple UI
- Tested the package to verify that the system performed to the desired qualifications
- *Utilized:* Simulink, Matlab, C, Arduino, soldering, oscilloscope, SolidWorks, controls, circuit design

Unified Robotics IV, WPI
- Created the algorithm of a turtlebot to navigate and map an unknown area
- Set up A* search to determining valid paths of movement to target location
- Programmed high-level strategy to efficiently map the area within the time constraints
- *Utilized:* Python, ROS, A* search

Unified Robotics III, WPI
- Programmed 2 DOF robotic arm to locate, pick and weigh blocks on a conveyor
- Determined end-effector positions using inverse kinematics programmed in MATLAB
- Tuned PID control for arm precise arm movements
- *Utilized:* C, Matlab, PID, UART, SPI, inverse kinematics

Cable-Cam, Alpinax
- Designed system to carry a camera and gimbal along a line at high velocity
- Designed custom hook-mounting and tensioning system for easy mounting of the platform
- Researched different ropes to satisfy the calculated tension requirements
- *Utilized:* SolidWorks, SolidWorks simulation package, knowledge of physics, knowledge of electronics

IR Camera Gimbal, Alpinax

- Designed camera gimbal to house a high-resolution camera and an IR camera in parallel
- Calculated and designed around center-of-mass balancing of the gimbal
- *Utilized:* SolidWorks, SolidWorks simulation package

VTX Casing, Alpinax

- Created a radio-transmitter case for drone gimbal to organize the components
- Built and tested clip-on prototype successfully, using a spring clip to mount the case
- *Utilized:* SolidWorks, SLS printing

Education

Worcester Polytechnic Institute: GPA 3.75
Bachelor of Science: Robotics Engineering - Rho Beta Epsilon (Robotics) Honor Society
Bachelor of Science: Mechanical Engineering - Tau Beta Pi (Engineering) Honor Society

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Personal Projects/Interests: 3D printing, NHL machine learning, Google AIY, Gardening, Hiking, Biking