Muhammad Bilal Ahmed

2016 Mechanical Engineering, University of Waterloo

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SUMARRY OF SKILLS

Design	Manufacturing	Software & Electrical
• Fixture Design	• Automation	• MATLAB, C++
• Design for Manufacturability	• Root Cause Analysis	• Digital Signal Processing
• FEA, Fatigue, Vibration Analysis	• Design of Experiments	• Data Analytics
• GD&T	• Metrology Capability Analysis	• OpenCV (computer vision)
• Certified SolidWorks Associate	• Lean Manufacturing	• Motor Control

WORK EXPERIENCE

Tesla Motors — Fremont, CA, USA

Powertrain Remanufacturing Intern — Sept. 2016 – Current

- Eliminating line safety hazards by **designing** ergonomic drive unit lifting mechanism, motorized rotary stands, and low cost pneumatic battery module flipping equipment
- Validating critical fixture components through **FEA**, **fatigue life** analysis and **prototyping**
- **Automating** adhesive removal by designing an air motor end effector for robotic arm
- Reducing scrap cost by designing **tooling** to press new bearings onto defective gears
- Developing automated tool for motor noise (NVH) diagnosis using microphones and accelerometers to improve quality. Analyzing **vibrations** in MATLAB using **signal processing**

Apple Inc. — Cupertino, CA, USA

Manufacturing Quality Engineer Intern — Sept. – Dec. 2015

- Programmed POC software for **computer vision** based surface defect inspection using MATLAB, OpenCV libraries and CCD hardware
- Led mechanical design of **automated inspection** machine, for Apple Watch bands and iPhone cases, through design reviews with multiple vendors
- Analyzed yields, QC processes and material flow during visit to Chinese factories, and identified **cost saving** and quality improvement opportunities

Toyota Motor Manufacturing Canada — Woodstock, ON, Canada

Quality Control Engineering Co-op — Sept. – Dec. 2013

- Resolved quality issues, for RAV 4 assembly, using **Toyota Business Practice** methodology
- Investigated **root cause** of high occurrence functional defect; Performed process capability analysis, designed trials, analyzed historical data and measured suspected parts using CMM
- Reduced **Quality Control** line downtime by discovering false positives from vehicle electronics inspection process and devised countermeasures
- Improved correlation of electric heater test by optimizing thresholds through trials

Singapore University of Technology and Design Singapore

Vehicle Research Engineer Co-op May. – Aug. 2014

- Programmed ECU hardware in **Simulink** to identify mass of electric vehicles using wheel position, motor current and voltage sensors. Achieved 3% accuracy by instrumenting system on the SMART-NUS autonomous golf cart (See: mbahmed.com/sutd)
- Built semi-automated tool to **reverse engineer** vehicle sensor signals in MATLAB; validated method by decoding CAN bus signals of Mitsubishi iMiev
- Developed software to playback vehicle sensor data to reduce CAN hardware testing time

Instron Norwood, MA, USA

Mechatronics Co-op Jan. – Apr. 2015

- Increased precision of computer vision based strain gauge by 20% through **design of experiments** and **statistical data analysis** in MATLAB
- Quantified effects of temperature, image sensor, air turbulence, calibration, and image processing algorithm on vision strain gauge measurement

Amphenol Canada Corp. Toronto, ON, Canada

Design Engineer Co-op Jan. – Apr. 2013

- Designed low form factor connectors, and produced 3D models and drawings in Solidworks
- Optimized design of stamped contacts, using FEA, to achieve minimal form factor
- Gained exposure to **GD&T**, and **Design For Manufacturability** (DFM) for injection molded parts

University of Waterloo Rocketry Team Waterloo, ON, Canada

Mechanical Engineer Co-op May – Aug. 2012

- **Fabricated** parts in shop, assembled and performed prototype validation for 20ft liquid bipropellant rocket
- Built launch station, and launched rocket with team for 2012 IREC competition in Utah

EDUCATION & PROJECTS

University of Waterloo Waterloo, ON, Canada

BASc, Honors Mechanical Engineering - Co-op Program 2011 – Apr. 2016

- Graduated with distinction: **3.7**/4.0 GPA

Autonomous Drone Battery Swapping Station | Capstone Design Project May 2015 – Apr. 2016

- Prototyped robotic battery swapping station for quadrotors using actuator, linear rails and Arduino

Certified SolidWorks Associate | Dassault Systemes Sept. 2012

More projects showcased at mbahmed.com