William J. Allison

(818) 585-7605
wjallison1122@gmail.com

www.linkedin.com/in/wjallison1122

Education

Master of Science in Mechanical Engineering — University of California, Irvine, April 2015
Bachelor of Science in Physics — Westmont College, June 2013

Experience

Lab Manager and Instructor of Physics and Engineering (Westmont College): April 2021 - Present

Role:
Manager of machine shop and Physics labs. Occasional instructor of Engineering courses, especially Manufacturing.
Helped in developing the Engineering program. Facilitated the acquisition of CAD software for the students to use, and several pieces of software for the faculty and students to share. Assisted in the development of Westmont's IP policy to better match Engineering faculty. Improved Rapid Prototyping capabilities.

E-Tools Application Developer (Kimball International): June 2020 - April 2021

Role:
Adaption of digital models of products from simple models (from SolidEdge) to interactive, configurable objects within CET Designer Software.
Acting as intermediary between Design Engineering and the rest of the E-Tools team.
Development of tools for SolidEdge written using their API.
Involves strong spatial insight and mathematical capability.
Requires CM programming, which is a proprietary language strongly related to C++.

Tutor (Tutor Doctor): February 2018 - April 2020

Role:
Math and Physics tutor for high school students, primarily CP courses.

Design Engineer (US Saws): March 2018 - February 2020

Role:
Research and Development: Product Development and Improvement
Note for following examples: I have obtained permission[1] to discuss and demonstrate the following projects in detail, and have images and models that I can show any interested parties.

- Primary role: To conceive of, design, prototype, test, and finally document for production a variety of products
    - Generated multiple ideas for either new products or extensions of existing ones
    - Was in charge of modeling all designs
    - Prototyped for generation of test data
    - Prototyped for first article verification
    - Produced drawings and other documentation according to industry standards (including GD&T)
    - Validated and approved first articles and first production runs
- Example: CoreEZ Gearbox Extension

[1] Please contact Warren Duncan at warren.duncan@ussaws.com for verification (and for a reference)

    - Designing for machining
        - First article was made in-house using my drawings
    - Designing for existing parts
        - Final product used many parts used in other actively sold products
    - Reverse engineering
        - Many parts of design were based on other products to minimize duplication of labor. Those other products were not always well-documented, to say the least.
    - Supplied Part Verification and Approval
        - Worked with suppliers to source needed parts according to very specific defined tolerances.
    - Validated and Approved Final Product
    - Packaging for sealing against very small particulates (~5 nm scale)
- Example: Cyclone Vacuum
    - Test Design
        - I decided what data we needed, what questions we needed to answer
    - Test Planning
        - How do we acquire the data, how do we design a test around the questions we need to answer
    - Test Execution
        - I fabricated the prototypes we needed for the testing, and I ran the tests.
    - Test Documentation
        - Created and maintained full engineering documentation of the tests
    - Circuit design for testing purposes
        - Utilized:
            - Microcontrollers (Arduino, primarily)
            - Analog Circuits
            - Digital Sensors
    - Prototyping for specific data
        - How do we make something that will work for the test using materials at hand as much as possible. We ended up creating approximately eight different testing prototypes, and essentially all were necessary for reaching our final conclusion.
    - Prototyping for final product accuracy
        - The final two prototypes were for testing, but they represented the final product as much as possible.
    - First Article Design Analysis
    - Fluid Dynamics
        - Fluid dynamics is not my specialty, but through research and a great deal of effort, we were able to accurately assess what was happening in our system
    - Reverse Engineering of a theoretical system
        - Design Analysis of others' systems
    - Design Controls
        - Finished product had to meet HEPA standards
    - Design of parts with complex curvature
        - SolidWorks does not make this a trivial task, but I know how to do it and can do it surprisingly quickly.
    - Design of parts with placeholder dimensions
        - Parametric design is a concept not many design engineers adopt, but it can be extremely valuable for continuing design even when some aspects are not yet known.
    - Design of parts for rotational molding
    - Interfacing with multiple departments, each with their own requirements
- Example: CoreEZ Flange Redesign
    - Failure Analysis
        - Analysis of existing product and how it was failing in the field

        - Analysis of proposed designs and where / how they were likely to fail
- Example: Various QC Tests
    - Design Controls Development
        - Establishment of standards
        - Development of pass/fail criteria to meet standards
    - We needed QC pass-fail and data gathering tests for a couple of different products. This included collecting data from a dynamometer, a flow tube, an electric current sensor, and a temperature sensor.
    - Programming
        - I created data collection applications to read the data from the testing equipment.
        - I created data analysis applications for some of the above to analyze the data and provide the user with a concise summary.
    - Microcontroller Programming and Circuit Design
        - Utilized:
            - Microcontrollers (Arduino, primarily)
            - Analog Circuits
            - Digital Sensors
            - Analog Sensors
            - Serial Communications
            - Packaging for all of the above
    - Coordination with other departments
        - I needed to know the exact criteria on which we would judge the products and what passable conditions would be.
    - Communication
        - On top of the above communication, I needed to make the programs as user-friendly as possible, walking an unknown user through the steps they needed to take to complete the test.
- Example: Meter Pit Pump
    - Designing for injection molding
        - Almost all parts were to be injection molded, so I needed to make sure all design changes were compatible with the process.
    - Designing for 3d printing
    - 3d printing of prototypes
    - Acquiring quotations
    - Injection Molded Part Verification and Validation
    - Electronics Packaging for full submersion in fluids (IP68)
    - Microcontroller Programming and Circuit Design
        - We performed a stress test on the first article that included switching it on (~10 seconds) and off (~2 seconds) repeatedly over the course of several days.
- Example: Production Line Support
    - Returned Product analysis and troubleshooting
    - Assembly Procedure Documentation
    - Collecting and Implementing line worker ideas and suggestions
- Example: Excavator Vacuum
    - Control Engineering
        - Linkage design
    - Designing for welding
    - Prototyping for final product accuracy
    - Packaging
    - Coordination with marketing
- Example: Water Wheel
    - Designing for aesthetics
    - Reverse engineering from images only
- Misc.

    - Administrative Task Automation

Design Engineer (Seal Science, Inc.): December 2016 - October 2017

Please note that due to the proprietary nature of the work, I cannot disclose specific details about any particular project.

- Example of work: Product development
- Example of work: FEA using Abaqus
    - Precise and accurate finite element analysis of elastomers is not trivial. I was already familiar with FEA, but this tested and extended my abilities.
    - Before FEA was conducted, we had to analyze the elastomers in question (which were frequently nearly unique) in the lab to obtain proper data for them.
- Example of work: GD&T
    - We were often supplied only parts or incomplete drawings as the authority data set, in which case we generated drawings according to proper guidelines.
- Example of work: Testing Adherence of product to State and Federal regulations
- Example of work: implementation of design controls on proposed product for space flight

Graduate Researcher (U.C. Irvine): September 2014 – June 2016

Research focus: robotic linkages -- generation and application

- C++ program for automated synthesis of 4- and 6-bar linkages
- Application of linkages to a variety of situations

Teaching Assistant (U.C. Irvine): Summer 2014 – June 2016

- FEA
- SolidWorks
- Stresses / Strains
- Engineering Design Process

Technical Skills

CAD

- SolidWorks
- Catia
- SolidEdge
- Other (Sketchup, Maya, various sculpting software)
- Other (Slic3r, various other slicing software)

FEA

- SolidWorks simulation
- Abaqus

Programming

- C++
- C#
- Python
- Various Scripting (Including Google Scripts)

Fabrication

- Manual Lathe
- Manual Mill
- Supporting machinery
- Designing for CNC
- Sheet Metal Work (cutting, stamping, pressing, bending)
- Welding (MIG, beginner at TIG)
- Woodworking

Teamwork

Affiliations and Interests

Member of United Methodist Church of Westlake Village
Current attendee of Trabuco Presbyterian Church
Literature (creation and appreciation)
    One published short story, 2013
Eagle Scout, 2008
American Society of Mechanical Engineers