Joseph W. Churchwell

Website: http://farafoot.com/ **Portfolio**: http://farafoot.com/portfolio/

I am a well versed multi-functional engineer with over 13 years of experience.

Highlights of Employment

Automation GT, San Diego **July 2015-Present**
http://automationgt.com/ **Engineering Generalist**

- Design of custom automation equipment for medical device and commercial electronics companies
  - Cholesterol lab testing machine
  - Bite valve slitting and inspection machine
  - Leak detection machine using Z-Axis' iKit
  - Clear vial inspection machine for DNA collection vessels
  - Powder sintering container assembly
  - Remote control testing machines
  - Cobalt-chromium band bending machine for heart valve replacement
  - Hipot testing machine
  - Balloon catheter gluing and inspection machine
  - Blister packaging inspection machine
- Application Engineering for project proposal
- SolidWorks design of enclosures, proposals and automated stacker
- Mechanical system analysis and component selection for BOM generation
- Electrical system component selection for BOM generation
- Machine control software development using **Ladder Logic, Arduino, VB.NET** and **C#**
- HMI development using Allen-Bradley and Advanced HMI
- Industrial PLC
  - Allen-Bradley RSLogix 500, RSLogix 5000
  - Industrial PC based DIO (Neousys)
  - Advantech controllers
  - Industrial Shields' M-DUINO using Arduino
- Electrical schematic creation and redline incorporation
- CiA 402 Custom Implementations for automated remote testing machine
- SCADA database creation and implementation
- Customer service and factory/site acceptance testing (FAT/SAT)
- Rapid prototype development for proof of concept proposals
- Machine vision programming using Teledyne Dalsa and Cognex camera systems
- Design of machine vision systems including camera analysis to selection, lighting, and lensing analysis and selection
- Cost reduction of machine components and vision systems
- Customer requirement trace matrices
- ANOVA Gauge R&Rs performed on machines
- Motors and Actuators: Chieftek, Oriental Motor, Parker, Allen-Bradley
- Sensors: photoelectric, ultrasonic, capacitive, retroreflective, RFID, IR, reed switch.

Pratt & Whitney AeroPower, San Diego **January 2009-July 2015**
pw.utc.com/Auxiliary_Power_Units **Software Engineer**

- APS2800 model based design using **MATLAB/Simulink** embedded coder
- APS2800 embedded Smart Terminal code to test and diagnose real time software control loops for black box testing (**C**)
- APS2800 DMM design and testing including embedded code
- Ethernet and RS232 terminal development (Smart Terminal, **C++**)
- Developed new processes and procedures
- Smart Terminal API documentation and protocol updates
- Highly experienced in requirements based automated testing (5+ years)
- APU controller full development requirements and software team lead
  - Decomposed high level software requirements (DOORS)
  - Requirements management and traceability (DOORS)
  - Performed reviews of requirements/test procedures/test scripts (PCR, IBM CM, Change)
  - Coordinated with and managed outsource suppliers using configuration management
  - Developed automated test software for embedded software testing (**.NET**, C, Python)
  - Designed and developed test equipment software for hardware control (**.NET**)
  - Development of technical specification documentation for test equipment
- Software applications for DO-160 testing (**.NET**)
- Fault isolation for maintenance and product support (Excel, Access & **Visual Basic**)
- NVM / DMM synchronization and fault recording (Using embedded C, SPI, RS485)
- Developed Simulink model for APS500D system integration (**MATLAB** / **Simulink**)
- Used in-circuit emulators (ICE) to debug software code
- Developed certified 3D interpolation function as well as control loop algorithms

Hamilton Sundstrand Power Systems, San Diego **April 2005-January 2009**
pw.utc.com/Auxiliary_Power_Units **Control Systems Engineer**

- APU system level requirements for APS3240 (A400M)
- Coordinated efforts to meet customer system integration requirements
- Fault isolation manual, root cause analysis for on wing FIM software
- ARINC 429 Requirement specification generation including interactive mode
- Control system design using PID control loops (**C**, **MATLAB / Simulink**)
- Requirement reviews, discrepancy reporting, configuration control, and updates
- Supported APU test cell activities

Proficiencies

Control Systems: Algorithms, Classic Control Theory (**PID**)
Electronics: H-Bridge, PWM, Motors, Microcontrollers (Microchip PIC, **MPC5554**, Arduino)
Serial Protocols: SPI, **Ethernet**, RS232/485, CAN, ARINC429

- **SQL**
- **C#**
- **VB.NET**
- **Linux**
- **Visual Basic 6**
- **Ladder Logic**
- **C / C++**
- **Arduino**
- **VBA**
- **HTML**
- **Software Version Control (Subversion)**
- **MATLAB / Simulink**
- **Configuration Management**
- **Ethernet (TCP/IP)**
- **SolidWorks**

Education

Master of Science in Computer Science (Intelligent Systems and Robotics)
San Diego State University, San Diego, San Diego, CA — Continuing Thesis

Bachelor of Science in Mechanical Engineering
San Diego State University, San Diego, CA — Spring 2006

Certification in Web Publishing
University of California San Diego, San Diego, CA — Fall 2009

MS San Diego State University

Specialization in Intelligent Systems and Robotics **August 2011 – 2018**

- Graduate GPA: 3.7
- Master's Thesis EEG controlled prosthesis. Comparison between Spectral Moments and FFT to determine EEG and EKG features in real time. Advanced machine learning functional comparison (SVM, Linear Regression, and Random Forests) to classify features.
- CS657 Intelligent Systems and Control
  - Genetic Algorithms, Artificial Neural Networks, Fuzzy Logic and Control, Neuro-Fuzzy system.
- CS609 – Computational Genomics
- CS600 - Methods of Bioinformatics (Machine Learning)
  - Supervised/Unsupervised, Bayes, PDF, KNN, ANN, Dimensionality reduction
- CS550 - Artificial Intelligence (Functional Programming)
  - Mini-Max algorithm for computer Mancala game play, A*
- CS656 - Advanced Robotics
  - Forward/Inverse Kinematics, Robot Jacobian
- CS556 - Robotics: Mathematics, Programming, and Control
  - Planar Robot, PID control, Gearing systems, Velocity/Acceleration/Jerk
- CS662 - Theory of Parallel Algorithms
  - PRAM Algorithm design, EREW/CREW/ERCW/CRCW
- CS582 - Introduction to Speech Processing
  - Blind Source Separation, ICA, FFT, Wavelet transform
- CS514 - Database Theory and Implementation
- Data Structures / Algorithms / Operating Systems

Extracurricular Coursework

- Coursera Machine Leaning (Summer 2014)
  https://www.coursera.org/course/ml