

# Nolann Williams M.S.

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Research engineer with focus on electronic system design, analog and mixed-signal electronics, digital interfaces, PCB design and firmware development, design of experiments and data analysis.

## Education

M.S. Electrical Engineering, Cal Poly San Luis Obispo, 2018

M.S. Genetics and Cell Biology, Washington State University, 2009

B.S. Animal Science, CSU Fresno, 2006

## Proficiencies

System design and interfacing	Firmware development
Design and analysis of experiments	Electronics validation and characterization
Rapid prototyping	Sensor validation and characterization
PCB design	Electronics applications in biology
Analog electronics and digital interfacing	Data analysis

## Skills

Analog: Discrete & IC component level electronics, A/D & D/A, high impedance systems, amplifiers & analog signal conditioning. Strong analog/digital interfacing and board-level troubleshooting skills. Oscilloscopes, spectrum analyzers, DAQ, DVMs

Digital: PIC, Atmel, Raspberry Pis and logic analyzers. Experience with low-level communication interfaces (asynchronous serial, I2C, SPI, etc.) and diverse peripherals (wireless power transfer, IMUs, GPS, microphones, MIPI cameras, visible and IR optical sensing, etc.)

Engineering: Embedded systems, systems engineering, schematic development (Eagle, Altium), SPICE, design for manufacture, thermal simulation, fine-pitch solder rework and basic machining

Languages: C, Python, MATLAB, PicBasic Pro

Laboratory: Chemistry and chemical safety. Confocal and Electron (SEM & TEM) microscopy. Cell culture, “Real-Time” PCR, recombinant DNA manipulation

## Experience

### ***Senior Engineer, 2022-2023, LTTS Engineering Services at Meta***

*Designed and built research platforms to evaluate next generation AR/VR sensors while collaborating in multi-disciplinary research system development*

- Collaboration with optical, mechanical, software and firmware groups to specify, design and prototype novel research systems at all phases from R&D to proof of concept
- Specification, design and prototyping of a pSoC based 50 ampere current driver for microsecond range pulses to hundreds of individually addressable LEDs

- Specification, design and prototyping of high gain (100 dB) analog signal conditioning PCBs for research of next generation high-resolution interferometry systems
- Specification for a gigahertz sinusoid generators & analog mixing systems and managing technical deliverables from external vendors

***Electrical System Engineer, 2019-2021, Pacific Northwest National Laboratory***

*Developed processes and technology for the US Water Power Technology Office to support marine renewable energy and environmental monitoring projects*

- Developed block diagrams, specifications, firmware flowcharts and coordinated mechanical, electrical, firmware development and cloud computing teams as Technical Lead for Oregon State University drifting passive acoustic monitoring buoys and tidally powered Coastal Real-Time Acoustic Buoy (tpCRAB) for research applications
- Developed Python controlled VectorNav VN-100 and Yost based inertial measurement unit and GPS systems to detect and analyze submarine magnetic features
- Specified, designed and managed technical deliverables from junior engineers in assembling a Python based system to control a NEMA 23 stepper based gantry for moving a fifty pound 1-5 GHz FMCW radar payload to detect oil spills under ice
- Developed MATLAB/Simulink simulations for Arctic buoy electrical systems. Performed thermal analysis of Arctic remote sensing package power systems when powered by wind, wave and solar inputs. Collaborated in designing experiments to evaluate commercial lithium battery chemistries and analyze results for application in Arctic remote sensing platforms

***Owner, 2013-2019, Borealis Blue Engineering***

*Provided full service electrical R&D and design services from concept development through commercialization to startups in San Diego and Los Angeles area*

- Designed and performed feasibility studies using SPICE/MATLAB simulations and prototyped low power, small design sizes, optical focusing and thermal management circuits
- Developed block diagrams, specifications and firmware flowcharts for electronic designs
- Designed and verified analog circuits such as op-amps, power management systems, DACs, ADCs for low power, low frequency, high SNR applications
- Developed mixed signal PCBs with linear/switching mode power supplies and SMD components
- Developed firmware on PIC 10F, 12F, 16F and 18F microcontroller lines in Microcode Studio and MPLABX IDE with XC16 and C18 compilers
- Worked with manufacturing houses on design for engineering and product testing protocols

***Master's Thesis, 2013-2018, Cal Poly San Luis Obispo***

*Developed technology to characterize and localize ultrasonic noise sources for industrial hygiene and drone detection applications*

- Developed an embedded system to study ultrasonic phase difference triangulation with MEMS microphones, analog signal conditioning and DAQ

- Developed post-processing code in MATLAB for analyzing acoustic parameters and vector finding of ultrasonic point source emitters

### ***Consultant, 2009-2017, TransBioTec***

*Performed foundational research and developed technology to sense ethanol and metabolites for medical, transportation and law-enforcement applications.*

- Researched Figaro 26XX gas sensor response curves to ethanol and atmospheric conditions
- Designed PCBs in Eagle for handheld and automobile mounted ethanol sensing units and interlocks to disable commercial vehicles
- Developed firmware for PIC16F and PIC12F MCUs in PicBasic Pro and MPLABX

### **Patents**

US Patent 9296298 (2014). Alcohol detection system for vehicle driver testing with integral temperature compensation

US Patent 20130238199 (2013). Alcohol Detection system for vehicle driver testing

### **Recent Publications**

N. Williams, D. Lu, J. McVey and R. Cavagnaro. Water Power Technology Office Report (2021). A comparative analysis of lithium ion battery chemistries for cold climate maritime applications.

N. Williams, J. McVey and R. Jeters. Water Power Technology Office Report (2021). Resiliency of polycrystalline diamond bearings exposed to marine environments.