

Eric Silk

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CURRENT EMPLOYER

Schweitzer Engineering Labs, Inc. Pullman, WA, USA

- Research Engineer, Government Services, Infrastructure Defense Division Apr 2018 – Present
 - Extensive AWS experience, including EC2, S3, Lambda, and IoT
 - Large Scale Data Cleaning/Analysis (>10TB) on Synchrophasors for the Department of Energy, including massively parallel analytics, data cleaning, event detection, etc.
 - Synthetic schematic generation for ML dataset bootstrapping/transfer learning
 - Docker development for encapsulation of legacy software, standardized computing environments, and robust parallelism
 - Genetic Algorithms, Optimization, Machine Learning as applied to varied topics in Power Systems
 - Mentoring in coding practices, Linux, signal processing, etc.
 - Compression of Power System Signals; patent applied for (17/172,447)
 - Demonstrated ability to handle sensitive information
- Associate Software Engineer, Precise Time and Communications Dec 2016 – Apr 2018
 - Developing product code for applications including GNSS receivers, a PTP library, and modular software defined switch module synchronization.
 - Software test implementation/execution experience, including unit testing (relying heavily on Google Test and Google Mock), functional testing, and integration testing at an inter-product level.
 - Occasional external assistance with signal processing and filtering concepts, outside the scope of my primary role. Topics included PID controller tuning and non-linear filters.

EDUCATION

University of Washington, Seattle, Washington, USA

- Masters Student in Applied Mathematics Jan 2019 – Dec 2021
 - Relevant Coursework: High-Performance Scientific Computing, Computational Methods for Data Analysis, Independent Research with Dr. Andrew Lumsdaine (multiple quarters), Fundamentals of Optimization, Inferring Structure of Complex Systems,
 - Cumulative GPA: 3.81 / 4.0

University of Idaho, Moscow, Idaho, USA

- Bachelors of Science in Electrical Engineering Aug 2012 – Dec 2016
 - Area of Emphasis: Controls and Signal Processing
 - Cumulative GPA: 3.16 / 4.0

RESEARCH EXPERIENCE

AMATH 600 Independent Research/Study,

The University of Washington and Pacific Northwest National Laboratory

- Second Order Methods for Scalable Optimization Jan 2021 – Present
 - Matrix-Free methods for Hessian approximation; optimizers utilizing these techniques
 - Homotopy Continuation as applied to Deep Neural Networks
 - Significant experience with PyTorch and Slurm
 - <https://github.com/lums658/ml20>
- Power Systems Simulation and Graph Theory Jun 2020 – Sep 2020
 - Introduction to load-flow simulation, PETSc, and Graph Theory
 - Exposure to Modern C++ techniques for graph representation and algorithms
 - CUDA/Thrust implementations of Matrix Factorizations

Autonomous Underwater Vehicle, University of Idaho

- Undergraduate Research Assistant Sep 2015 – Dec 2016
 - Project: Development of acoustics datalogger, electric field sensors, and inter-microcontroller communications
 - Research areas: Electric fields in water, embedded software

PATENTS

- **Compression of Power System Signals**, Schweitzer Engineering Laboratories Feb 2021
 - Applied for in February 2021, application number 17/172,447
 - Compression of Power System Signals through the use of Linear Predictive Coding and Golomb Rice codes
 - Initially intended to lower the transmission bandwidth and storage requirements of the data archival of the SEL T400L to enable high fidelity, high bandwidth, long term analytics
 - Compression ratio of 5.7-7.4x compared to prior, naive implementation, supporting >1 year of data on a 3.5" drive

ACADEMIC AWARDS

- **Dean's List**, Spring and Fall 2016, University of Idaho 2016
For attaining a semester GPA of at least 3.5.

	<ul style="list-style-type: none"> ▪ Engineering Scholars Certificate, Engineering Scholars, University of Idaho 2014 For outstanding participation and contributions to the Engineering Scholars Program, including sponsored design projects and specific coursework.
OTHER AWARDS	<ul style="list-style-type: none"> ▪ Eagle Scout, Boy Scouts of America Nov 2010 Completed numerous requirements, ranging from First Aid to Environmental Sciences, and lead a charitable construction project for the city of Hayden Lake.
VOLUNTEERING	<p>FIRST Robotics, Pullman SciBorgs, Team 4061</p> <ul style="list-style-type: none"> ▪ Mentor Sep 2016 – Mar 2018 <ul style="list-style-type: none"> • Mentoring High School students for a robot design competition • Programming and computer topics including C++ and Linux
OTHER WORK EXPERIENCE	<p>University of Idaho, Moscow, Idaho, USA</p> <ul style="list-style-type: none"> ▪ Teaching Assistant, Microelectronics Lab Jan 2016 – May 2016 <ul style="list-style-type: none"> • Taught both laboratory sections, covering topics that included diodes, BJT's, MOSFET's, amplifier design, and non-ideal opamp behavior. Used Cadence extensively. • Graded homeworks, tests, and lab reports in a timely and accurate fashion • Received positive feedback from the students and professor for my ability to explain the topics and willingness to meet outside of lab for review and study sessions.
SKILLS	<p>Programming</p> <ul style="list-style-type: none"> ▪ Python <ul style="list-style-type: none"> • Daily Development for Work, School, and Personal Projects • Extensive experience with Multiprocessing, PyTorch, NumPy, SciPy, Matplotlib, Pandas, and others • Modern Practices, including Unit Testing, Type Hinting, Abstract Base Classes, Data Classes, etc. • AWS Frameworks, such as the IoT SDK and Lambda ▪ C++ <ul style="list-style-type: none"> • Familiarity with OOP, Inheritance, Polymorphism, Lambda expressions, and Templates • Working knowledge of Make and CMake • Decent experience with GoogleTest and GoogleMock for unit testing • Experience with Eigen for Linear Algebra ▪ MATLAB <ul style="list-style-type: none"> • Working knowledge, typically for conversion to Python or when required by constraints • Use of compiler for interfacing with Python ▪ C <ul style="list-style-type: none"> • PIC32 using MPLabX. Used FreeRTOS, RS-232, I2C, SMBus, EEPROM in various projects. • TI C2000 processors using CodeComposerStudio. Basic IIR filter, datalogging to an SD card using FatFs, serial communication with PC GUI. ▪ SystemVerilog <ul style="list-style-type: none"> • Digital Design Course • Designs including LFSR's, distributed memory, ILA's, debug cores, AXI4-Lite, IP cores, and basic I/O. • Final project utilized an ARM core communicating with an FPGA coprocessor over an AXI4-Lite bus before sending final values out via SPI. ▪ \LaTeX <ul style="list-style-type: none"> • Nearly all written reports/documents since Junior year of College (when permitted), including this resume. <p>Other Skills</p> <ul style="list-style-type: none"> ▪ KiCAD ▪ Electronics assembly (through-hole and SMD) ▪ Electronics diagnostic tools, including: multimeter, oscilloscope, and function generators
INTERESTS	Guitar, Audio processing, Photography.
REFERENCES	Available upon request

[Resume compiled on 2021-12-12 for UW Madison]