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 boot-strapping/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 Reserarch/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 techinques
  - 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 compred 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.

- **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

- **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

FIRST Robotics, Pullman SciBorgs, Team 4061

- Mentor Sep 2016 – Mar 2018
  - Mentoring High School students for a robot design competition
  - Programming and computer topics including C++ and Linux

OTHER WORK EXPERIENCE

University of Idaho, Moscow, Idaho, USA

- Teaching Assistant, Microelectronics Lab Jan 2016 – May 2016
  - 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

Programming

- Python
  - 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++
  - 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
  - Working knowledge, typically for conversion to Python or when required by constraints
  - Use of compiler for interfacing with Python
- C
  - 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
  - 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
  - Nearly all written reports/documents since Junior year of College (when permitted), including this resume.

Other Skills

- 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 2021-12-04 for the Purdue University*]