

Education

- 2008–2013 **BS**, *Univ. of Nebraska - Lincoln*, Physics, & Computer Science
2013–2016 **MS**, *Univ. of Nebraska - Lincoln*, Physics
2013–2019 **PHD**, *Univ. of Nebraska - Lincoln*, Physics

Doctoral thesis

- title *Measurement of the production cross section of four top quarks in proton-proton collisions at 13 TeV*
supervisor Frank Golf

Experience

- 2013–2020 **Graduate Research Assistant, UNL**
- Developed control software for a gantry used in the production of CMS pixel detector modules; deployed same software on similar gantries at leading US research institutions
 - Designed a particle telescope based on silicon strip detectors
 - Designed readout system around a Cyclone IV FPGA and high frequency ADCs.
 - Laid out PCBs for data acquisition system as well as separate boards for mounting sensors and readout chips.
 - Implemented firmware in Verilog, including a simple RISC processor and memory mapped IO interfaces.
 - Implemented assembler for instruction set used by aforementioned RISC processor.
 - Contributed to the reconstruction of electrons at CMS by optimizing the algorithm used to match tracks with electromagnetic calorimeter energy deposits
- 2020–Current **Detector Lab Manager, UNL**
- Oversaw day to day lab activities and provided support to students and post docs
 - Continued to support the development of the gantry control software
 - Implemented in LabVIEW an interpreter for a BASIC-like command language, gScript, to enable faster and easier development of assembly procedures.
 - Added new visual pattern recognition for automated fiducial marking acquisition.
 - Added database integration for automated tracking of components during production.
 - Built and maintained a web-based electronic logbook to track and report lab activities
 - Managed small and large purchases of equipment and supplies
 - Served as the coordinator of module design and assembly for the ETL detector at CMS which included
 - Refining the module design for increased robustness and ease of assembly
 - Designed fixtures for automated module assembly and worked with machine shop to produce them
 - Designed and procured mock module components, including PCBs, to verify assembly at scale
 - Designed thermal mock-up of module with integrated temperature sensing; laid out and procured PCBs for same

Computer skills

Languages Python, C/C++, LabVIEW, Javascript, Verilog

Libraries ROOT, OpenCV, NumPy, Matplotlib, Flask, FastAPI, Vue.js

Software Linux, Git, KiCAD, Autodesk Inventor, Quartus II

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