

PRINCE JOHN

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EDUCATION

Washington University in St. Louis, St. Louis MO

PhD in Computer Engineering

2024 – Present

Advisors: Roger Chamberlain and Lee Sobotka

MS in Computer Engineering

2021 – Present

BS in Electrical Engineering

2021 – 2024

Beloit College, Beloit WI

BS in Computer Science, Physics

2018 – 2022

RESEARCH EXPERIENCE

Washington University CSE Department

May 2023 – Present

Graduate Research Assistant

St. Louis, MO

Advised by Roger Chamberlain

- Developed an extensible data acquisition system to interface with custom ASICs, designed to support high-throughput readout from over 1000 scintillator detector channels in nuclear physics experiments, in collaboration with Lawrence Livermore National Laboratory.
- Designed and implemented a modular Python-based graphical user interface and backend application to configure lab-manufactured semiconductor chips, enabling scalable deployment and maintainability across institutional users.
- Investigated analog memory architectures for waveform capture applications, and created a discrete-event simulation framework in Python to model timing behaviors and evaluate performance of mixed-signal pulse shape discrimination ASICs.

Pakula Biomedical Research Project

June 2020 – Aug 2020

Research Scholar

Beloit, WI

- Conducted a machine learning-based investigation into heart disease prediction using the UCI Heart Disease dataset, focusing on feature importance and clinical relevance.
- Designed a two-stage model that incorporated coronary artery features to improve classification performance for disease outcome prediction.

PRESENTATIONS

Poster: “*Advancing ASIC-Based PSD Systems: Simplified and Scalable Solutions for Large Channel-Count Detector Arrays*”

Presented at the Scientific Advisory Committee (SAC) Meeting, CENTAUR collaboration, Lawrence Livermore National Laboratory (LLNL), July 2024.

Poster: “*Advancing ASIC-Based PSD Systems: Simplified and Scalable Solutions for Large Channel-Count Detector Arrays*”

Presented at the NNSA Grant Review Meeting, Texas A&M University (TAMU), September 2024.

Poster: “*ASICs for the FRIB era*”

Presented at the 2024 SSAP Symposium, Texas A&M University (TAMU), February 2024.

Symposium Talk: “Employing Data Mining Techniques on Biomedical Voice Measurements to Predict Parkinson’s Disease”

Presented at the 44th Annual Student Symposium, Beloit College, April 2020.

TEACHING EXPERIENCE

Washington University CSE Department

Jan 2022 – May 2022

Teaching Assistant, Computer Architecture

St. Louis, MO

- Provided one-on-one and lab-based support to students enrolled in an introductory computer architecture course, helping them understand concepts such as pipelining, caches, and datapath design.
- Assisted students in debugging and implementing VHDL-based projects on FPGAs, including simplified RISC processor architecture.

Beloit College Computer Science Department

Sep 2020 – May 2021

Teaching Assistant

Beloit, WI

- Guided students through introductory coursework in Python and Java, with a focus on algorithmic thinking, recursion, and object-oriented programming.
- Provided structured code review sessions and held office hours to reinforce core data structure concepts such as lists, trees, and hash maps.

Beloit Learning and Enrichment Services

Sep 2019 – May 2021

Peer Tutor

Beloit, WI

- Delivered peer-led tutoring sessions for students enrolled in Calculus I & II and Physics I & II, focusing on building conceptual understanding and problem-solving skills.
- Received faculty endorsements based on tutoring effectiveness and strong academic performance.

WORK EXPERIENCE

Netlink Software Group

Jun 2019 – Sep 2019

Software Development Intern, BI Department

Bhopal, India

- Created a Python-based system that generated optimal business intelligence visualizations dynamically, using rule-based logic encoded in JSON format to adaptively present diverse datasets.

Beloit College Maker Lab

Sep 2019 – Mar 2021

Lab Manager and Co-President

Beloit, WI

- Led student-run operations of the Maker Lab, overseeing policy creation, machine maintenance protocols, and user safety training.
- Designed and delivered hands-on workshops on 3D printing and digital fabrication to train student staff and community members.

Beloit College IT Department

Oct 2018 – May 2019

Innovation Team Software Engineer

Beloit, WI

- Developed and deployed an Arduino-based data logging system to track the usage of external monitors in the college library, enabling data-informed infrastructure planning.

SELECTED PROJECTS

WiFi Signal Strength Covert Channel

- Created a covert communication system by encoding binary data into WiFi signal strength (RSSI) fluctuations; implemented a Python-based receiver to detect, synchronize, and decode the hidden message stream.

OFDM Signal Transmission and Reception Using Amateur SDR Devices

- Utilized the GNU Radio Companion open-source toolkit to generate and detect OFDM signals in real time, visualized OFDM waveforms in both time and frequency domains to explore spectral behavior.
- Conducted experiments with varying antenna lengths, orientation, and shadowing to demonstrate wireless fading effects at the physical layer. **Article:** cse.wustl.edu/~jain/cse574-22/ftp/ofdm_sdr/index.html

ROS2-based Pole Climber Robot

Robotics Practicum

- Wrote embedded C code to control motors and encoders on a pole-climbing robot using μ ROS over Raspberry Pi Pico microcontrollers.
- Implemented closed-loop control and real-time sensor feedback integration for autonomous climbing behavior.

Working Bikes Web Order Portal

Database Capstone Project

- Developed backend REST APIs for a Django-based web application to manage pickup orders for Working Bikes, a nonprofit bike shop in Chicago.
- **Tools:** Python, Django, React, nginx
- **GitHub:** github.com/kellyer22/Working_Bikes

IoT Room Automation System

- Designed a complete smart room automation system using ESP8266 microcontrollers with MQTT and Google Assistant integration for remote voice-controlled switching.
- Developed backend services in Python and Flask and configured reverse proxy handling via nginx.

Simplified DES ASIC

- Designed and laid out a CMOS chip implementation of the Simplified Data Encryption Standard (S-DES) using Cadence Virtuoso, including schematic, layout, and LVS/DRC verification.

TECHNICAL SKILLS

Programming Languages:	Python, Matlab, C, Verilog, Verilog-A, VHDL, TcL
Platforms:	Linux/Unix systems, RHEL, Virtualization (Podman, Docker)
Tools:	Git/GitHub, Bash, Cadence Virtuoso, Fusion 360, AMD Vivado/Vitis