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Nathaniel Nauman

nnauman@purdue.edu | 765.413.4228 | linkedin.com/in/nathaniel-nauman-59018a193 | natenauman.com

Education

PURDUE UNIVERSITY
MS in Electrical Engineering
May 2023 | GPA: 4.0/4.0

PURDUE UNIVERSITY
BS Honors in Comp. Engineering
Dec 2022 | GPA: 3.72/4.0

QALAM WA LAWH
Intermediate Level in Arabic
Aug 2019 | Rabat, Morocco

Graduate Coursework

Solid State Devices and Physics
MEMS & IC Design and Fabrication
Applied Quantum Computing
Quantum Transport and Current Flow
Fault-Tolerant Computer Design
Artificial Intelligence
Computer Design & Prototyping

Skills

PROGRAMMING
C • Python • MIPS, ARM Assembly
Verilog • KiCad • Fusion 360

LANGUAGES
English (Native) • Conversational in French, Arabic, and Bengali

Projects

DEVICE FABRICATION
Aug 2022 – Dec 2022
Used ALD, lithography, and wet etching to fabricate MEMS cantilevers in the Birck Nanotechnology Center cleanroom

MULTI-CORE PROCESSOR
Aug 2021 – Dec 2021
Built a pipelined multi-core processor with cache coherency on FPGA and wrote dual-thread code in assembly. Compared with and without caches to find an 84% increase in instruction rate (MIPS)

FPGA USB TRANSMITTER
Jan 2021 – May 2021
Led a small team to build a USB and data buffer on FPGA and taught others how to implement cyclical error-checking

MAZE-SOLVING ROBOT
Jan 2020 – May 2020
Trained a path-finding algorithm in Python

Research

PROFESSOR DATTA'S LABORATORY | Research Assistant
May 2021 - Pres | Supv: Thomas Duncan Distinguished Prof. Supriyo Datta
- Created probabilistic-bit accelerator to perform numerical analysis on systems modeled by strongly nonlinear stochastic differential equations

QUANTUM SEMICONDUCTOR SYSTEMS | Research Assistant
May 2022 - Pres | Supv: Bill & Dee O'Brian Distinguished Prof. Michael Manfra
- Built dilution refrigerator sample carrier for fractional quantum Hall effect data

FAULT-TOLERANT COMP. SYST. DESIGN | Student Researcher
Jan 2022 - Jun 2022 | Supv: Prof. Saurabh Bagchi
- Led a small team to offload analytics onto programmable switches by developing filter hardware; then I presented at the 2022 intl. DSN conference

SOYBEAN PRODUCT INNOVATION COMPETITION | Winner
Sep 2020 – Apr 2021 | Supv: Distinguished Prof. Michael Ladisch
- Won first place with an award of $20,000; then I presented to the state senate at the Industry Affairs committee

LAB OF RENEWABLE RESOURCES ENGR. | Research Assistant
Sep 2019 – Apr 2021 | Supv: Distinguished Prof. Michael Ladisch
- Experimented on proteases in enzymatic hydrolysis for new soy biostimulant

May 2018 – Aug 2018 | Supv: Distinguished Prof. Michael Ladisch
- Used high-performance liquid chromatography to analyze proteins for Eli Lilly

Leadership Experience

INVERSE KINEMATICS ARM | Senior Design Team Leader
Jul 2021 – Dec 2021 | Embedded Systems Design Team
As team leader, my team and I built a smart hexapod leg that finds the optimal path to any coordinate. We achieved 3:1 force multiplication with our revolutionary new elbow joint designs by developing pulley-cabling linkages based on tendons

PURDUE SOLAR RACING | Electrical Lead & VP of Operations
Aug 2018 – May 2022 | Solar-Powered Car Student Organization
Organized workshops for designing the motor controller and battery management

Awards

2023 NSF Graduate Research Fellowship and State Department CLS recipient
2022 ECE Undergraduate Excellence Award Honorable Mention
2021 Winner of $20,000 Student Soybean Product Innovation Competition
2019 Purdue Trustees Scholarship and two CFGL scholarships
2019 Full Scholarship from Nat'l. Security Language Initiative for Youth
2017 Awarded top 35 high-school poets in U.S. by Nat'l. Student Poets Assoc.

Publications and Posters

[1] N. Nauman, J. Kaiser, and S. Datta. P-bit and FPGA acceleration of sampling for modeling log-normal colored noise in nonlinear oscillator. *Poster presented at: The Elmore ECE Emerging Frontiers Center on the Crossroads of Quantum and AI*, 2022.

[2] N. Nauman, R. Wu, and S. Bagchi. Real-time digital filtering for IoT data in programmable network switches. *52nd Annual IEEE/IFIP International Conference on Dependable Systems and Networks - Supplemental Volume (DSN-S)*, 2022.