

# Mark V. Van Kirk

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## EDUCATION

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### University of Notre Dame

*B.S. in Computer Science*

Notre Dame, IN

*Expected May 2025*

## TECHNICAL PROJECTS

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### Dillon's Service System

*Software Engineer*

Aug 2023 – Dec 2023

*Notre Dame, IN*

- Launched website for kitchen staff to manage food orders at Bullwinkle's, the student-run restaurant in Dillon Hall
- Implemented an entity relationship diagram in SQL to manage menu items, order status, and staff credentials
- Optimized food preparation time through a scheduler that populates digitized trays with incoming food orders

### Battery Desulfator

*Computer Engineer*

Aug 2022 – Oct 2022

*Notre Dame, IN*

- Built a battery desulfator to eliminate crystallization buildup in the electric scooter batteries of other students
- Contributed to an updated hex file required to flash the microcontroller chip (ATmega328) on the DIMP 2, an open-source battery desulfator based on a technical expert's paper titled "Capacitive Battery Charger"

### Classic Car Restoration

*Mechanical Engineer*

May 2019 – May 2022

*Dallas, TX*

- Rebuilt a British sports car (1964 MGB) by referencing the *MGB Workshop Manual* and consulting professionals
- Installed new timing chain, crankshaft bearings, and piston rings in the engine; Installed new master cylinder, lines, calipers, and rotors for the brakes; Rewired the dashboard, lights, and ignition system onto a new wiring harness

## EXPERIENCE

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### University College Dublin

*Research Assistant*

May 2024 – Aug 2024

*Dublin, Ireland*

- Recovered 60% of an 128-bit AES encryption key from a small device (Nordic nRF52 DK) using electromagnetic side-channel analysis with a software-defined radio (Nuand bladeRF), leading to a full key recovery via brute-force
- Reduced the number of potential keys from  $2^{128}$  to  $2^{50}$ , cutting key recovery time from years to less than one day

### University of Notre Dame

*Teaching Assistant*

Aug 2023 – Dec 2023

*Notre Dame, IN*

- Coached students in implementing data structures and algorithms for Programming Challenges, an elective focused on solving puzzle-type problems, by hosting weekly office hours and grading assignments on GitHub Classroom

### The Carter Center

*Software Engineering Intern*

Jan 2023 – May 2023

*Remote*

- Wrote a custom scorer in Python capable of mapping Sudanese locality misspellings to a standardized spelling with an accuracy of 98%, allowing epidemiologists to more efficiently document the distribution of vaccines in Sudan

### Center for Research Computing

*Research Assistant*

May 2023 – Aug 2023

*Notre Dame, IN*

- Engaged in the benchmarking of current language models across different quantizations and datasets, revealing metrics (latency, number of parameters, etc.) that provide insight during the design of hardware accelerators
- Wrote bash scripts to execute commands on super-computers with access to GPUs via the Univa Grid System

## CLASSES

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**Electives:** Distributed Systems, Database Concepts, Artificial Intelligence, Web Development

**Books:** Linux Command Line, Linux Bible, Competitive Programmer's Handbook, Theory of Computation

**Clubs:** ND Linux Users Group, EnableND (Prosthetic Design), Board Game Club

## SKILLS & INTERESTS

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**Advanced:** C, C++, Java, SQL, Git, Docker, Python

**Familiar:** Golang, HTML, JavaScript, CSS, Amazon AWS, SolidWorks, LaTeX

**Interests:** Arch Linux, Open Source, Personal Blog, Raspberry Pi