Nicholas Spruce

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Summary

Computer Engineer with 7+ years of experience in object-oriented and systems programming, along with 4+ years of leadership across engineering and interdisciplinary teams. Experienced in building full-stack applications, designing embedded systems, and collaborating on scalable software solutions.

Education

University of Michigan **August 2023 - December 2026**
Bachelor of Engineering in Computer Engineering *Ann Arbor, MI*

Relevant Coursework

- Data Structures and Algorithms
- System Design of a Search Engine
- Computer Organization
- Logic Design
- Electronic Circuits
- Electronics for Atmospheric and Space Measurement

Technical Skills

Programming Languages: C++, C, Python, Java, JavaScript, HTML/CSS, SQL, Verilog, MATLAB
Operating Systems: Linux, Windows
Frameworks/Tools: Flask, Git, Makefile, Google APIs
Hardware/EDA: STM32, ATtiny, FPGAs, SPI, I2C, Altium Designer, KiCad

Experience

Software Engineering Intern **June 2025 - August 2025**
SEO (Sponsors for Educational Opportunity) *Remote*

- Engineered a full-stack Flask application integrating REST APIs (TMDB, YouTube), optimized SQLite3 queries for rapid data retrieval, and deployed on Render with responsive HTML/CSS/Jinja templates.
- Built a scalable Flask platform leveraging AI-driven recommendations via Google Gemini, implemented secure data pipelines in SQLite3, and applied agile iteration to improve user experience in a startup-style environment.

Projects

Design of a Fluid Simulation Pendant | *C++, C, STM32, ATtiny* **February 2025 – Present**

- Designed a 1-inch PCB to hold 178 micro-LEDs controlled through charlieplexing from a microcontroller.
- Developing backend software to simulate a 2D FLIP fluid, driven by accelerometer and gyroscope data from a BMI270.
- Using STM32L011 and ATtiny1626 microcontrollers to allow real-time LED response to physical motion.

Design and Implementation of a Search Engine | *C++, Google Cloud, Distributed Systems* **January 2025 – Present**

- Collaborated with a team of 6 to design and implement a scalable C++ search engine without STL.
- Leveraged Google Cloud Compute to coordinate distributed crawling across up to 20 virtual machines.
- Stored and indexed over 100,000 websites across 5 machines, achieving query response times under 5 seconds.

TCME Bridges Project | *Python, Firebase* **January 2025 – Present**

- Designed a tool with a team to match 100 current students and alumni based on shared interests and career goals.
- Built a scalable database to manage and update student–alumni records for long-term relationship matching.

Stratospheric Payload Design – Team Lead | *Altium, Arduino Nano, Python* **January 2024 – May 2024**

- Led design and deployment of a robust payload to the stratosphere, achieving best-in-class thermal performance.
- Designed a custom PCB in Altium with Arduino Nano to interface with both digital and analog sensors.
- Conducted 5+ drop tests from four stories, validating payload durability and component integrity.
- Developed Python scripts to analyze sensor data from 6 photoresistors and created a 3D visualization of sensor readings over two hours.

Leadership / Extracurricular

University of Michigan Men's Glee Club **Winter 2024 – Present**

Small Group Sings Manager *Ann Arbor, MI*

- Coordinated over 120 small group performances by managing schedules and organizing rehearsals.
- Maintained communication with both internal members and over 20 external organizations to secure performances.
- Automated scheduling and planning processes through data-driven tools to ensure successful execution.

Chelsea High School **January 2022 – June 2023**

FIRST Robotics: Technical Difficulties (Team 1502) – Software Lead *Chelsea, MI*

- Led programming efforts for competitive robotics, ensuring robust and reliable autonomous and manual operation.
- Mentored new members in programming fundamentals, troubleshooting, and collaborative development.
- Fostered cross-functional communication with mechanical and electrical teams to coordinate successful builds.