

Nicholas W. Breitling

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EDUCATION

Northwestern University, Evanston, IL

Sep. 2024 - Present

- GPA: 4.0/4.0
- Coursework: Programming Languages, Data Structures and Algorithms, Computer Systems

Northeastern University, Boston, MA

Sep. 2024 - Present

- GPA: 4.0/4.0
- Coursework: Accel. Fundamentals of Computer Science 1 and 2, Accel. Discrete Structures, Intensive Math Reasoning, Logic & Computation

Minnetonka High School, Minnetonka, MN

Sep. 2019 - Jun. 2024

- GPA: 4.615 (W), 4.0 (UW); ACT: 36
- Coursework: AP CS A, AP CS Principles, Calculus 1-4, Linear Algebra
- Awards: National Merit Scholarship Award, Dartmouth Alumni Club Book Award, AP Scholar with Distinction, Summa Cum Laude

RESEARCH & PROJECTS

Research Assistant, PRL-PRG

Jan. 2024 - Sep. 2024

- Collaborated on the development of a new infrastructure for just-in-time compilation of the R programming language
- Aided in transition from C++ to a Java compile server, focusing specifically on RDS serialization
- After completion of RDS writer, integrated serialization system as a communication protocol between C++ frontend and Java backend, enabling comprehensive integration testing via package compilation

Independent Researcher, Minnetonka Research

Sep. 2022 - May 2023

- Project title: *Improving sphere blending performance for fluid simulation applications using ray-marched rendering*
- Worked with Vulkan to develop ray-marched and mesh rendering engines, utilizing a smooth-min distance field and a marching-cubes algorithm, respectively, for sphere blending.
- Compared performance metrics for both algorithms, highlighting efficiency of ray-marching
- Twin Cities Regional Science Fair: awarded blue ribbon (first place in Systems Software category), purple ribbon (advancement to State), and Stockholm Junior Water Prize

Other projects (*full list at github.com/breitnw*)

- *mndco11age.xyz*: Portfolio website and webserver; developed with Rust and OpenSSL
- *rhyolite*: Apple Music miniplayer and queue manager, developed with Rust, C, and SDL2
- *micromusic*: Vulkan-based mesh rendering engine, developed with Rust and GLSL

EXPERIENCE

Project Lead, The Humanity Alliance

May 2021 - May 2023

- Service internship with the Humanity Alliance, non-profit delivering 9,000 meals/wk to food-insecure families
- Developed and programmed a full-stack, user-friendly dashboard to streamline integration of meal requests and delivery data with an interactive map, greatly reducing manual entry time by automating route calculation and assignment
- Maintained communication with organization leadership to address needs for administration, user permissions and security

Camp Counselor (“Sensei”), Code Ninjas

Summers 2021 - 2023

- Lead counselor for weekly camps throughout summer. Provided one-on-one and presentational instruction to guide campers through curriculum and difficult concepts related to programming and application development
- Planned and implemented supplemental lessons in Lua and Scratch programming, 3D modeling, music distribution, and more, fostering an engaging environment for advanced campers

EXTRACURRICULARS

Volunteer CS Educator, Evanston-Skokie School District 65

Jan. 2025 - Present

- Teach weekly computer science classes to 5th graders at Oakton Elementary School as part of education research conducted by Northwestern's TIDAL and tiilt labs
- Introduce students to concepts such as loops, variables, and debugging while fostering self-expression through use of TunePad, a Python-based music production tool

eCVT Developer, Northwestern Baja SAE

Oct. 2024 - Present

- Develop ESP32 microcontroller software for eCVT (electronic continuously-variable transmission)
- Configure and tune hall-sensor and linear encoder PID inputs, maintaining optimal output RPM

Curriculum Developer, StemOUT

Jan. 2024 - Apr. 2024

- Developed an educational curriculum for elementary (K-5) schoolers with the goal of "teaching AI without computers", including interactive lessons on history, functions, and ethics. Taught this curriculum and others at public libraries.

Captain, FIRST Robotics Team 3082

Sept. 2019 - May 2023

- Oversaw electronics and programming subteams; led the development of an OpenCV-based stereoscopic vision system, physically-modeled robot simulation, Swerve drivetrain, inverse-multiplexed button board, and other subsystems
- Won Innovation in Control award, progressed to FRC World Championship during 2023 season

Other: Scouts BSA, Eagle Rank; Tonka Hacks Hackathon, 1st place; NHS; Symphonic Band

SKILLS

Programming Languages and Frameworks

- *Functional:* Racket, Haskell
- *Systems:* Rust, C, x86 Assembly, C++
- *Web/App Dev:* Java, JavaScript, Python, Flask, Jinja, JQuery
- *Graphics:* Vulkan, OpenGL
- *Config/VCS:* Nix, Elisp, Make, Git