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 Strctures, 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