Nicholas W. Breitling

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EDUCATION

Northwestern University, *Evanston, IL* › GPA: ---/4.0 — Sept. 2024 – Present

Northeastern University, *Boston, MA* › GPA: 4.0/4.0 — Sept. 2023 – Apr. 2024
- Relevant coursework: Accel. Fundamentals of Computer Science 1, Accel. Discrete Structures, Intensive Math Reasoning

Minnetonka High School, *Minnetonka, MN* › GPA: 4.615 (W), 4.0 (UW); ACT: 36 — Sept. 2019 – June 2023
- Relevant coursework: AP CS A, AP CS Principles, Calculus 1-4, Linear Algebra
- National Merit Scholarship Award, Dartmouth Alumni Club Book Award, AP Scholar with Distinction, Summa Cum Laude, Academic Letter (9, 10, 11, 12)

EMPLOYMENT & INTERNSHIP

Humanity Alliance, *Victoria, MN* › Project Lead — 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

CodeNinjas Chanhassen, *Chanhassen, MN* › Camp Counselor ("Sensei") — Summer 2021, 2022, 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

ACADEMIC RESEARCH & PROJECTS

Programming Research Laboratory, *Prague, CZ* › Research Assistant — Jan. 2024 – Sep. 2024
- Collaborated on the development of a new infrastructure for cached 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

Minnetonka Research, *Minnetonka, MN* › Independent Researcher — Sept. 2022 - May 2023
- Project: *Improving sphere blending performance for fluid simulation applications using ray-marched rendering*
- Worked with Vulkan to develop and optimize separate ray-marched and mesh rendering engines, utilizing a smooth-min distance field and a marching-cubes algorithm, respectively, for sphere blending and benchmarking relative performance
- Twin Cities Regional Science Fair: awarded blue ribbon (first place in Systems Software category), purple ribbon (advancement to State Science and Engineering Fair), and Stockholm Junior Water Prize

Other projects *(full list at github.com/breitnw)*
- *mndco11age.xyz:* Portfolio website and webserver; developed and deployed from scratch with OpenSSL and Rust
- *micromusic:* Apple Music miniplayer and queue manager, developed with Rust, C, AppleScript, and SDL2
- *rhyolite:* Vulkan-based mesh rendering engine, developed with Rust and GLSL

EXTRACURRICULAR INVOLVEMENT

StemOUT, *Boston, MA* › Curriculum Developer — Jan. 2024 – Present
- 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 for free at public libraries.

FIRST Robotics Team 3082 › Captain — 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

VANTAGE UX Design › Project Lead — Sept. 2021 - June 2022
- Spearheaded full website redesign for LMI Lawn Care, a local business based in Brainerd, MN. Improved user experience via iterative usability testing; guided team through ideation, data collection, prototyping, development, and presentation

Other involvement: Scouts BSA, Eagle Rank; Tonka Hacks Hackathon, 1st place; National Honor Society; Symphonic Band