ANDREW MAO

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EDUCATION

Bachelor of Science, Computer Science — Expected Grad: May 2027
University of British Columbia, Vancouver, BC — (Current GPA: 4.33/4.33)

EXPERIENCE

Software Engineering Intern
Redbrick, Victoria, BC — *January 2025 – August 2025*

- Developed core components and backend services for the Shift Browser (**~2M MAUs**) using C++ Chromium.
- Engineered in-app **subscription services** using HTTP and Chromium's profile/identity architecture to sync user plans from secure database and to deploy priced-features for a new subscription-model revenue stream.
- Developed robust **user authentication** flow, implementing OAuth 2.0/PKCE standards to integrate AWS Cognito, and UI using the Views framework/Polymer to optimize multi-device browser sign-ins.
- Established novel dev-ops tooling, including performance profiling with Perfetto, doc generation & hosting via AWS, and patch injection into the V8/Blink compiler to modify the *Blink* rendering engine and streamline developer experience.

UBC ThunderBots Software Developer
UBC ThunderBots, Vancouver, BC — *September 2023 – Present*

- Roster member in UBC's multidisciplinary student team to design autonomous soccer robots for international RoboCup competitions (~3000 participants). Ranked **2nd** internationally in **RoboCup** 2024 SSL Division B as Grand Finalists.
- Overhauled defensive strategy using Boost/SML state machines to implement *STP* for novel handling and foul reduction.
- Integrated Bazel 8 and implemented various toolchain optimizations, including a redesign of a Protobuf-to-Nanopb trans-compiler using Starlark, resulting in a **35% reduction** in compilation times.
- Created an onboard diagnostics CLI leveraging Typer (Python), pybind11, (C++) and Unicast for a developer device/ platform agnostic debugging process via SSH.

PROJECTS

Execution Order - *Unity Game Engine, C#*

- Directed a team of 5 over **96 hours** to design a clone & time manipulation 2D puzzle-adventure game for the 2025 Game Maker's Toolkit game development competition.
- Designed and implemented core time-manipulation game mechanics, levels/world-building, post-processing VFX, and integration between technical & non-technical contributors.
- Ranked top **4%** amongst **37 000** participants in the largest game jam in Itch.io history (2025).

PyScreenReader - *C++, Python, pybind11, Starlark*

- Co-owner of opensource **cross-platform** python **library** for parsing on-screen UI info using abstracted system APIs.
- Spearheaded windows implementation of parsing *COM* interfaces and abstracting native C++ Win32 elements into unified python data model using the IUIAutomation framework and pybind11.
- Led Bazel development for multi-platform/architecture, compilation pipeline, and testing using GoogleTest.

Pikspace - *C#, XR/VR, Unity Shaders*

- Developed physics-accurate DLSR **camera simulation** in virtual reality to train amateur photographers in nwHacks 2025.
- Implemented realistic optical simulation displays in response to user adjustments to ISO, shutter speed, aperture, and focal length, using the High-Definition Rendering Pipeline (HDRP) APIs.
- Integrated Meta Quest 3 VR support into the Unity environment, using OpenXR for input detection.

TECHNICAL SKILLS

- **Languages**: C++, Python, C#, Java, JavaScript, Typescript, Starlark, R
- **Frameworks**: React, Unity, Chromium, pybind11, nanopb, Google Test
- **Developer Tools**: Bazel, Ubuntu, PlatformIO, Firebase, Protocol Buffers, Redis, GN, Ansible