

JAMES FOLK

Embedded & Resource-Constrained Systems | C/C++ · Real-Time · Device Software · Handheld Consoles

Mount Sinai, NY · (631) 327-0064 · jamesfolk1@gmail.com · linkedin.com/in/jamesfolk1 · jamesfolk.me/embedded-development

SUMMARY

Twenty years of C and C++ on hardware that does not forgive waste. I shipped seven Nintendo DS, DSi, and Game Boy Advance titles where the memory budget was measured in kilobytes, built multithreaded real-time software for lane-side tolling hardware clearing millions of daily transactions, ran a Phidgets single-board computer serving 24 sensor device types, and led the video player team for a Roku set-top app used by millions, where the render thread and the task thread have hard limits you design around rather than discover. I am strongest where the constraint is memory, latency, or a device that has to keep running.

CORE SKILLS

Languages: C, C++ (11/14/17/20), Python, Swift, Lua, SQL, BrightScript, Java, JavaScript, Dart

Constrained systems: Memory and performance optimization under fixed budgets, multithreading and concurrency, real-time and low-latency design, cache and allocation discipline, profiling

Device and platform: Nintendo DS/DSi/Game Boy Advance, Phidgets single-board computer, Android NDK native (C++/JNI), Roku SceneGraph, iOS/tvOS, OpenGL ES 2, HoloLens 2

Sensors and I/O: 24 Phidget device types over a wireless TCP/IP link, real-time plotting, webcam video streaming off an embedded board, Flask service on the board itself

Applied cryptography: AES-256-GCM envelope encryption with wrapped data keys, key-encryption-key rotation across active and retired key ids, cryptographic erase, SHA3-256 hash chains, HMAC-SHA256, RS256 JWT (server-side, not device boot)

Build and tooling: CMake, Ninja, Make, Jenkins, GitHub Actions, Docker, Git, gtest, Linux/macOS/Windows

DEVICE AND CONSTRAINED-SYSTEMS EXPERIENCE

Senior Software Engineer | Neology, Inc.

December 2024 - January 2026 · Texas (remote and field)

- Designed and built multithreaded real-time C++ for lane-side tolling hardware processing millions of daily micro-transactions under strict latency and accuracy requirements, where a missed read is lost revenue and a late read is a wrong one.
- Built and maintained high-throughput, highly available systems across roadside and back-office subsystems, and owned the full lifecycle in C++, SQL, and JavaScript.
- Supported field deployments and live-environment integration on installed roadside equipment.

Principal Software Engineer | Green Energy Research, Inc.

April 2013 - November 2019 · Stony Brook, NY

- Built the data-logging system around a Phidgets single-board computer: a Python Flask service running on the board itself, driving 24 Phidget device types and serving sensor data over a wireless TCP/IP link.
- Wrote the iOS and Android clients that capture that sensor data, plot it in real time, and stream webcam video off the embedded board.
- Wrote a native Titanium module exposing the sensor stack to both mobile platforms from one implementation.

Game Programmer | Powerhead Games

2006 - 2010 · New York, NY

- Shipped seven Nintendo DS, DSi, and Game Boy Advance titles for 2K Sports, Konami, Ubisoft, and Powerhead's own label, in C and C++ on handheld hardware where the memory budget is kilobytes and megabytes and there is no room to grow out of a bad allocation decision.
- Titles: Major League Baseball 2K10 (2K Sports, DS, audio programming); Did It Myself ABC123 (DSiWare, the first DSiWare title the ESRB rated EC); Glow Artisan (DSiWare, IGF Mobile 2010 Best Mobile Game Design winner, Nintendo Life 9/10); Winx Club: Mission Enchantix and Winx Club: Quest for the Codex (Konami, DS and Game Boy Advance); Petz: Catz 2 and Catz (Ubisoft, DS).

Lead / Senior Software Engineer | Zebra Technologies

August 2019 - May 2021 · Holtsville, NY and London, UK

- Led a computer-vision project inside the native Android NDK and C++ codebase on Zebra's handheld scanning hardware.

- Refactored a single-threaded native capture application into a three-thread architecture and raised rendering throughput with OpenGL ES 2.

Principal Roku Developer | Comcast

February 2023 - July 2025 · Philadelphia, PA

- Led the team owning the Roku Video Player inside Xfinity Stream, used by millions of subscribers. Roku devices impose hard memory ceilings and a strict split between the render thread and the task thread, so playback work is budgeted up front rather than profiled after.
- Integrated the Roku Ad Framework into VOD with SCTE-35 signal parsing and a FreeWheel ad-URL builder; led the Interstitial Library integration into linear streaming, which grew linear ad revenue 300%.
- Wrote an RFC 6570 compliant URITemplate library that the service's HLS to DASH migration was built on.

Founder / Principal Software Engineer | NJLIGames Ltd

October 2010 - Present · Mount Sinai, NY

- Architected and maintain a proprietary cross-platform C++ engine targeting Windows, Linux, macOS, iOS, and Android from one codebase, powering 10+ original games and VR experiences.
- Built the encrypted document vault in a production product: per-file AES-256-GCM data keys wrapped by a key-encryption key, rotation across active and retired key ids without re-encrypting file bytes, and cryptographic erase by destroying the wrapped key. Server-side, with unit tests covering tamper detection and wrong-key rejection.
- Designed an append-only SHA3-256 hash chain and HMAC-SHA256 nullifier scheme for anonymous voting, so a record can be proven untampered without revealing who wrote it.

ADDITIONAL EXPERIENCE

Senior Roku Developer | NBCUniversal

January 2026 - July 2026 · Remote

- Video player work on Peacock for Roku through Super Bowl LX and the Winter Olympics; stabilized a crashing unit-test suite by fixing memory issues and integrated Adobe Edge analytics.

Software Engineer (Blockchain) | Block One (B1)

October 2019 - May 2020 · Virginia

- C++ engineer on a high-performance blockchain team: smart contracts, core chain functionality, and integration libraries.

Software Systems Engineer IV | Envrmt by Verizon

January 2017 - June 2019 · Remote

- Integrated 3D physics into VR, AR, and 360-degree video streaming across five platforms; improved the engine's CMake and Jenkins CI and built tooling for the EvrVault asset platform.

Earlier and concurrent roles: Platinum Team Lead, Scale AI (2023-2024) · Project Lead Developer, NIST (2022; Unity, HoloLens 2, Vuforia) · Senior Software Engineer, Warner Bros. Discovery (2020-2022) · Principal Roku Developer, The Church of Jesus Christ of Latter-day Saints (2021-2023) · Halo Gameplay Engineer, 343 Industries (2021) · Game Developer, Visual Concepts/2K (2021) · Mobile Software Engineer, CA Technologies (2014-2016) · Software Developer, OpenLink Financial (2011-2013).

EDUCATION & CERTIFICATIONS

Doctor of Science, Computer Science (in progress), University of North Dakota

MBA, Business Administration & Management, Strayer University (2022)

B.S., Computer Science, Stony Brook University · A.S., Computer Science, Suffolk County Community College

Certificates: Machine Learning, Columbia Engineering (2019) · Machine Learning with Python · Agile with Atlassian Jira