Hal W. Canary

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Professional Summary

Senior systems software engineer with 15+ years of experience in Go, C++, and C. Spent six years maintaining core subsystems of Skia, the C++ graphics library underneath Chrome and Android, where every change ships to billions of devices and must stay compatible with existing callers. Leaves long-lived codebases faster, leaner, and more reliable: cut the memory overhead of Skia's PDF generator by more than half, and wrote most of a Go rewrite of a macOS monitoring agent that uses less than half the resources of the Java version it replaced. Experienced in large-scale refactors, thread safety, and cross-platform native code for macOS, Linux, Windows, Android, and iOS.

Technical Skills

- Languages: Go, C++, C, Python, Shell, Objective-C, Java, JavaScript.
- Systems: macOS, Linux, and Unix; Android and iOS; Windows. Native libraries and JNI/Objective-C bindings; Git, CMake, Docker, LLDB.
- Specialties: systems programming, large-scale refactoring of mature codebases, memory and performance optimization, thread safety and concurrency, cross-platform native development, test infrastructure, 2D graphics and document generation, scientific and numerical computing.
- Also: Go microservices, React/JavaScript frontends.

Experience

- **Senior Software Engineer**, Aternity/Riverbed Technology, Durham, NC — *January 2021 – December 2025*
  - Systems engineer for the macOS Digital Experience Monitoring (DEM) agent: a multi-process, privilege-separated system made up of both launchd daemons and per-user launch agents, each running with different permissions, deployed across many enterprise fleets.
  - Wrote about 75% of a ground-up Go rewrite that replaced the previous Java implementation entirely, cutting resource use by more than half.
  - Ported the macOS DEM agent to Linux.
  - Contributed to early macOS porting of the Riverbed Unified Agent, including designing the protocol its components used to communicate with each other.
- **Senior Software Engineer**, Voith Digital, Raleigh, NC — *April 2020 – October 2020*
  - Built Go microservices for the backend of Voith OnCumulus, an Industrial Internet-of-Things platform, on a distributed remote team.
  - Full-stack work on the Paper Break Protector tool, which uses machine learning to predict industrial problems and display those risks to machine operators (React/JavaScript frontend).
- **Software Engineer**, Google, Inc., Chapel Hill, NC — *September 2013 – January 2020*
  - Maintained SkPDF, the PDF generator in Skia (skia.org), the C++ 2D graphics library on billions of Chrome and Android devices; SkPDF is used by Chrome printing and the Android framework. Redesigned the entire subsystem to stream output as it was generated (e.g., images were written out immediately and tracked only by a unique ID, not held in memory), more than halving memory overhead across a series of changes and using very little memory when writing directly to a file (skia.org/docs/user/sample/pdf).
  - Made SkPDF thread-safe, letting Skia's test suite run PDF tests in parallel, and added optional multithreaded compression that made a large-document benchmark ~7× faster, all without breaking existing users.
  - Created SkQP, test infrastructure that turned Skia's rendering tests into new Android Compatibility Test Suite tests for OpenGL ES and Vulkan drivers in Android Pie and Android 10, run by Android device makers to certify GPU drivers (skia.org/docs/dev/testing/skqp).

  - Built, tested, and debugged Skia across Linux, macOS, Windows, Android, and iOS; wrote Android and iOS apps linking the native C++ library to Java (via JNI) or Objective-C (e.g. halcanary.org/skottie-ios-app).
  - Wrote git-sync-deps, a stand-alone Python tool that fetches Skia's dependencies without Chromium's depot_tools; it became the standard way to sync Skia's dependencies (halcanary.org/git-sync-deps).
- **Research Assistant**, UNC-Chapel Hill Computer Science, Chapel Hill, NC — *May 2011 – August 2013*
  - Designed and developed the MADAI Distribution Sampling Tools (github.com/MADAI/DistributionSampling) and the MADAI Visualization Workbench (github.com/MADAI/MADAIWorkbench), novel tools for visualizing high-dimensional statistical distributions.
  - Wrote C++ VTK filters, ParaView macros, and Qt programs to visualize physics, meteorology, and cosmology simulation data, working with domain scientists on requirements.

Education

- **Master of Science, Computer Science**, University of North Carolina at Chapel Hill — *September 2011 – August 2013*
- **Bachelor of Science, Physics and Mathematics**, University of Wisconsin-Madison — *September 1997 – May 2001*

Publications

- Hal Canary, Russell M. Taylor II, Cory Quammen, Scott Pratt, Facundo A. Gómez, Brian O'Shea, Christopher G. Healey. "Visualizing Likelihood Density Functions via Optimal Region Projection." *Computers & Graphics* 41 (2014): 62–71. doi:10.1016/j.cag.2014.02.005 (halcanary.org/optimal-region-projection)
- Steffen A. Bass, Hannah Petersen, Cory Quammen, Hal Canary, Christopher G. Healey, Russell M. Taylor II. "Probing the QCD Critical Point with Relativistic Heavy-Ion Collisions." *Central European Journal of Physics* 10 (2012): 1278–1281. doi:10.2478/s11534-012-0076-1
- Hal Canary. "Aztec Diamonds and Baxter Permutations." *The Electronic Journal of Combinatorics* 17 (2010), #R105. doi:10.37236/377