

Brandon M. Wilson
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W H A T I ' M A B O U T

Grok all the levels. Be the *somebody* in “somebody should do that.”

I am an infrastructure programmer and DevOps specialist with over twenty years of combined personal and professional experience on Linux. My specialties include deep knowledge of low-level Linux internals, advanced mathematical methods, and a keen eye for bug hunting.

My background is varied and highly non-linear. The non-chronological nature of the following sections reflects this, opting for a topical organization over temporal.

M Y S K I L L S

Programming Languages

Advanced: Shell / C / Objective-C / T_EX
Intermediate: x86 assembly / Haskell / Java / Python
Beginner: J / Scheme / Lua / Clojure / Perl 5

Technologies

Advanced: Linux / Google Compute Engine / Version Control (git/svn/darcs)
Abstract Algebra / Differential Geometry / Topology
Intermediate: Linux kernel / Virtualization (qemu/xen) / Containerization (unshare/cgroups)
SQL (postgres/sqlite) / Formal Verification (metamath) / Android / iOS
Beginner: HTTP Server (nginx) / x86 bootstrapping (coreboot)

Natural Languages

Native: English
Conversational: Japanese / Spanish

E M P L O Y M E N T

Index, Co. 2012/05 – 2014/05

Research Developer +81 3 5779 5080

Media Solutions Division, Mobile Contents Department
Japan 154-0004, Tokyo-to, Setagaya-ku, Taishido 4-1-1, Carrot Tower, Floor 13
<http://www.indexweb.jp/>

Originally hired as a mobile software developer for iPhone and Android, I accumulated experience programming in C, Objective-C, and Java. Eventually this morphed into a mixed-capacity position of R&D and crisis-prevention. In the R&D rôle I was responsible for prototyping team-developed ideas. In the crisis-prevention rôle I was the go-to guy for solving particularly tricky software bugs our development team encountered.

Cosmo Global Communications School 2010/05 – 2012/04

English Language Liaison +81 52 331 1531

Japan 460-0022, Aichi-ken, Nagoya-shi, Chuo-ku, Kanayama 4-1-24, Cosmo Building II 9F
<http://www.cosmo-school.jp/>

This was my ticket to Japan. I worked in multiple capacities as a translator, English teacher, and primarily as a liaison, designing materials and presentations to facilitate cross-cultural business exchanges.

Friends of Robert Aitken 2009/09 – 2010/04

Technical Consultant (808) 735 1347

P.O. Box 37872, Honolulu, Hawai'i 96837
<http://www.aitkenroshi.org>

Acting as the private technical consultant to a wealthy individual, I was in charge of introducing, teaching, and optimizing this individual's daily computer workflow.

Volk Innovations 2009/06 – 2009/09

System Modeling Lead (808) 923 5665

3872 Owena Street, Honolulu, Hawai'i 96815
<http://www.volkinnovations.com/>

I was contracted by a private inventor to create a mathematical model for a particular epoxy-mixing process he was developing. It involved developing the proper geometry of a mixing chamber to tune variations in index of refraction of the cured epoxy.

University of Hawai'i 2008/05 – 2009/05

Researcher (808) 956 4679

Department of Mathematics
2565 McCarthy Mall (Keller Hall 401A), Honolulu, Hawai'i 96822
<http://math.hawaii.edu/>

In a collaborative research endeavor with a department professor, I investigated p -adic analysis, with specific focus on applications in geometry.

Heirloom Bookshop

2007/04 – 2007/12

Contract Developer

(843) 469 1717

54 1/2 Broad Street, Charleston, South Carolina 29401

<http://www.theheirloomcollection.com/>

Contracted to implement a web scraper for a rare book store. Implemented in Python, it would monitor sites for the sale and purchase of rare books. It would track price movements in the market as well as alert when finding especially lucrative deals.

Johns Hopkins University

2006/04 – 2007/04

Research Assistant

(410) 516 7346

Henry A. Rowland Department of Physics and Astronomy

3400 North Charles Street, Baltimore, Maryland 21218

<http://physics-astronomy.jhu.edu/>

This was an x-ray astronomy laboratory making heavy use of a Linux HPC cluster. My rôle was to manage the cluster and Python data analysis pipeline.

National Aeronautics and Space Administration

2004/06 – 2004/08

Project Engineer

(281) 483 3809

Lyndon B. Johnson Space Center, Engineering Directorate

2101 NASA Parkway, Houston, Texas 77058

<https://www.nasa.gov/centers/johnson/home/index.html>

Worked on the team in charge of developing the first high definition live video stream on the International Space Station. I was personally in charge of initial quality testing as well as optimizing the software UI for minimal cognitive burden on the astronauts.

E D U C A T I O N

Waseda University, Department of Fundamental Science and Engineering

2017/09 – 2019/09

Doctor of Philosophy in Applied Mathematics

+81 3 5286 3000

Japan 166-8555, Tokyo-to, Shinjuku-ku, Okubo 3-4-1

Continuing from the Master's, I studied discrete theories of space-time that reduce to General Relativity in the continuous limit. This program was cut short due to unavoidable external circumstances at the time.

Waseda University, Department of Fundamental Science and Engineering

2015/09 – 2017/08

Masters of Applied Mathematics

+81 3 5286 3000

Japan 166-8555, Tokyo-to, Shinjuku-ku, Okubo 3-4-1

I studied discrete analogues of differential geometry, in an attempt to find better models for certain classes of non-linear differential equations.

Waseda University, Department of Fundamental Science and Engineering	2014/05 – 2015/09
Academic Research	+81 3 5286 3000
Japan 166-8555, Tokyo-to, Shinjuku-ku, Okubo 3-4-1	

As a return to academia, I assisted a professor of computational General Relativity building and implementing models for fast, high-precision approximations to non-linear differential equations.

University of Hawai'i at Mānoa	2008/01 – 2009/05
Baccalaureate of Arts, Mathematics	(808) 956 8111
2500 Campus Road, Honolulu, Hawai'i 96822	

Texas A&M University - Department of Mathematics	2005/08 – 2005/12
Baccalaureate of Arts, Mathematics	(979) 845 3211
Mailstop 33, Texas A&M University, College Station, Texas 77843-3368	

Texas Academy of Mathematics and Science	2003/08 – 2005/05
High School	(940) 565 4955
TAMS 1155 Union Circle #3053, University of North Texas, Denton, Texas 76203-5017	

Graduated High School two years early to attend college. This is a program of the University of North Texas that specifically caters to young college entrants age 16 and below.

M Y P R O J E C T S

https://www.gnu.org/software/guix/	In progress
Guix on Google Cloud Platform	Scheme (Guile)
NixOS / Linux / GRUB	gcloud / gsutil / qemu

Porting the Guix System to Google's Cloud infrastructure. Guix makes it possible to declaratively define system configuration and deploy binary-equivalent instances of each. I am working on first-class integration with Google's Cloud Platform.

http://metamath.org	Nascent
Learning Formal Proof Systems	metamath

My background is in pure math and I have an interest in formal verification methods. As a foray into the world of formal mathematics and proof verification, I am working on a proof of Hurwitz's theorem in the Metamath language.

https://github.com/koreader/koreader	Completed
DjVu Metadata Support in KOREader	Lua / C

Learned project organization, Lua, and Lua-C FFI over the course of a few days in order to implement feature I personally wanted—support for DjVu metadata. The project is a “better document viewer” for your e-reader.

git://git.wilsonb.com/j-play Ongoing

Experiments With J Language J (901)

J is an array-programming language in the APL family. Think “executable math notation”. It is famous for its paradigm-breaking syntax and semantics as well as extreme performance characteristics on large data. I love this language and generally find much value in having a broad-spectrum facility with different “thinking paradigms”.

git://git.wilsonb.com/hello-world In progress

Hello World in Raw ELF Format x86_64 (GNU as)
GNU libc / Linux kernel readelf / objdump

In an attempt to fully grok the ELF format as well as linker/loader specifics, I am implementing an ELF “hello world”, written in GNU assembler, AT&T syntax. By far the trickiest part is correctly setting up dynamic linking.

git://git.wilsonb.com/xstatus.git Completed

System Monitor Backend in Shell POSIX Shell
procfs / coreutils / sed / gawk shellcheck

An exercise in minimalistic POSIX shell scripting. I implemented the backend system monitoring infrastructure to be fed to a frontend system bar tool, *e.g.* lemonbar, dzen2, *etc.* Of note is its reliance on Linux’s procfs as a data source instead of parsing the output of userspace tools.

git://git.wilsonb.com/blog-alpha Ongoing

Person Blog Haskell (ghc)
Hakyll stack

My personal blog, using the static site generator Hakyll. This forms part of my ongoing dabbles with the Haskell language.

git://git.wilsonb.com/fintools Completed

Visualization of Time-Series Stock Data Averages Bash
shellcheck / bats

Written entirely in bash, this script provides an interface to download and view time-series stock data. The motivation was to play with the idea of “exponential moving average.” The cool visualization is a 2-D surface with the “exponential weight” providing the third axis.

git://git.wilsonb.com/shdoc In progress

Javadoc-style Documentation for Shell Scripts sed

Mainly started as a way of learning the sed command language more deeply. It implements a compiler from Javadoc-style shell commands into a ReStructured Text document. The architecture decouples frontend from backend, so ostensibly it should be easy to support other output formats. The script itself is about 150 lines of sed.

git://git.wilsonb.com/si

Completed

Minimalistic IRC Client Frontend for Use With `ii`
`ii` (Suckless IRC client) / `vim` / `coreutils` / `inotify-tools`

Bash
shellcheck

Yet another bash script wrapper around minimal CLI tools. This began as an attempt to learn bash scripting and the IRC protocol more deeply. It grafts a minimal UI on top of the Suckless IRC client `ii` using only standard Linux tools. The result is surprisingly usable.

git://git.wilsonb.com/docs

Ongoing

This Document Plain $\text{T}_{\text{E}}\text{X}$ / `make` / `YAML` / `POSIX Shell (dash)`

This project contains this document, which is developed in Plain $\text{T}_{\text{E}}\text{X}$. Please see the `src/curriculum-vitae/document.en_US.tex` source file. It implements several sophisticated macros in an MVC-like philosophy.

git://git.wilsonb.com/dc

Ongoing

Library of Macros for the `dc` Calculator

`dc` (GNU `bc`)

The `dc` program is the forebear of the `bc` command line calculator. It is an RPN, stack-based terse language for basic calculations. Personally a fan of minimal languages as well as venerable Unix tools, this project combines both to implement a minimal set of statistical analysis tools as `dc` macros.

S Y S T E M S

wilsonb.com

Personal Playground VPS

Google Cloud Platform	Static site (<code>nginx</code>)	MTA (<code>postfix</code>)	DKIM (<code>opendkim</code>)
DMARC (<code>opendmarc</code>)	IMAP server (<code>dovecot</code>)	Tor hidden service	<code>taskwarrior</code>
IRC bouncer (<code>znc</code>)	XMPP server (<code>prosody</code>)	git repository host	<code>fail2ban</code>

This is a VPS on Google Compute Engine. I use it to host a collection of servers for personal use. Primarily it provides a place for me to learn about and hack on internet infrastructure protocols, including email. I also use it as a safe target for penetration testing. This is what hosts my personal email.