Billy Donahue   646-206-5974
Brooklyn, NY   billy@dadadada.net

Professional Experience

Sirius XM Radio, New York, NY and Princeton, NJ

Jan 2001 – Oct 2008
Senior Software Engineer (as contractor, then full time employee since 2006)
- Responsible for major portions of firmware code deployed in several million receiver units.
- Developed ARM and DSP firmware for satellite radio receiver, responsible for audio decoding and queueing, control of frontend ASICs, and user interface handling. Firmware runs on the open source eCos RTOS, in an extremely tight memory-constrained multiprocessor environment, written in C++. Performed assembly-level analysis, debugging, and especially optimization for ARM7 and ARM9 processors.
- Improved and ensured code extensibility and quality by producing Perl and Tcl/Tk scripts to automate the testing, simulation, and even generation of several key software modules.
- Responsible for correctness, integrity, and maintenance of sensitive subscription management and cryptographic code in receiver firmware and lab equipment. Designed and maintained security schemes for workstations and network resources which handle secure keys and code.
- Took various team-building, infrastructural, and communications responsibilities over several years as team grew from three to fifteen members. Instituted and ran a firm but constructive line-by-line code review process as team size and software quality requirements necessitated. Became a valuable resource driving software structural and style conventions. Developed a valuable custom tool for producing HTML-rendered changeset diffs from a CVS repository.
- Drove architectural discussions and specification feedback processes feeding into the design of new features and products.
- Developed and supported a multiprocessor system to manage decoding of the innovative Sirius Backseat TV video product.
- Improvised a custom JTAG interface over a PC parallel port to program a flash memory in a development system, to work around an undocumented target.
- Developed and maintained data acquisition and analysis systems for receiver chipset verification and mobile receiver test programs, integrating GPS, signal strength measurements, audio processing, and realtime digital data sampling into a laptop-based solution. Produced an interactive visualization application for this data, allowing an analyst to navigate through these massive collections using I/O event logs, maps, or tagged audio captures.
- Developed SNMP monitoring and control capabilities of mission-critical terrestrial radio repeater network.

The Cooper Union, New York

September 2005 - present (evenings, 1 or 2 courses per year)
Adjunct Professor of Electrical Engineering

- My *Communication Networks* course is an EE-centric, in-depth treatment of protocols and techniques in networks of diverse scales and purposes from inter-IC embedded serial communication to the Internet (runs every spring semester).
- I teach *Computer Security* as a hands-on lab class focusing on malware and vulnerability research, secure programming practice, and access control schemes (runs in even-numbered fall semesters).

B'nai Zion Scientists Division, New York

March 2001 - present (weekends, runs 2 or 3 times per year)
- This free program assists immigrant scientists and engineers with retraining and job placement.
- Instructor: *Linux System Administration*. Covers basics of Linux systems from installation to scripting and maintenance. This popular and rewarding class has produced many entry-level sysadmins over the years.

Zebware, New York

August 2000 - December 2000
C, Java, & Perl Developer
- Assisted in implementation of an innovative browser-based webpage design tool for a startup. This web application used MySQL-driven JSP to serve early Javascript layer control code, allowing users to place scriptable objects on a canvas to create scenes. Used for promotional websites such as AustinPowers.com

Name.Space, New York

Unix, DNS, & Web Admin / C, Perl, & Database Developer
January 1999 - August 2000
- As sole engineer, implemented a modperl CGI frontend and PostgreSQL backend for a domain registrar service. Designed an integrated registration, activation, billing, and account maintenance system.

Lucent Technologies, Whippany, NJ

Member of Technical Staff
(internship, then employment concurrent with graduate coursework)
June 1998 - January 1999
- Prepared channel model simulation engine utilizing a multiprocessor array of SHARC DSPs on a VME backplane in support of the Lucent 3G research program for NTT DoCoMo (Japanese wireless provider).
- Implemented the channel estimator for a 3G wireless base station's embedded DSP firmware.

Lok Technology, New York

Software Engineering Contractor, freelance (concurrent with coursework)
June 1997 – June 1998
- Audited, debugged, refactored, and secured a mid-sized Perl codebase for an OpenBSD-based network appliance for the accounting and management of revenue-generating WiFi Hot-spots. Device was based on an Apache mod-perl in-

terface to Perl services controlling the configuration of a lightweight OpenBSD machine.

Vuepoint, Roslyn, NY

Java & Javascript Developer (concurrent with coursework)
October 1995 - March 1997

- Designed a Java-based online system installed primarily for internal employee training programs at large companies.
- Developed an engine for authoring and displaying animated course material.
- Implemented a visually stimulating interactive quizzing and grading system, featuring drag-and-drop questions, animated multiple-choice buttons, etc.

Academic Background

The Cooper Union, New York.

- **Bachelor of Electrical Engineering**, May 1997
- **Master of Electrical Engineering**, May 1999

Academic focus on digital signal processing, image and video processing, digital communications, and software engineering topics.

Thesis Topic: *Efficient Implementation of a 2D Wavelet Transform on the TMS320C80 Multiprocessor DSP.* Partitioned a realtime iterative filter-based video compression task among 5 processors (and a specialized memory management unit for xy image flips).

Achievements

- 6-year Full-Tuition Scholarship, The Cooper Union 1993-1999.
- Produced a robotic sculpture in the form of a coin-operated skill crane amusement machine with artist John Hodany, shown at the 11 Rivington Gallery, Feb 2008.
- 3-time winner, "Hacker Jeopardy", DEFCON conference (2005, 2006, and 2008).
- Solved *all* exercises (but not the term projects) in the 230-page "Basic Concepts" chapter of *The Art of Computer Programming*, as a personal challenge (2004).
- Winner, Kipling "Hacker Crack Game", 1999.
- Merck NJ State Science Day, 2nd Prize in Physics, 1993.
- Merck NJ State Science Day, 13th Place in Physics, 1992.