

## Introduction

*As a developer and mathematician, I have made a career of turning computer needs into computer solutions. Along the way, I have been an algorithm developer, a lead, an architect, a software engineer, and a systems administrator.*

*I thrive on challenge. I thrive in situations where creative solutions are needed.*

## Overview

**Patent** (pending) 14/542,795. "AUTOMATED CONSTRUCTION OF INFINITE IMPULSE RESPONSE FILTERS"  
**Development** in back-end, front-end, and middle tier software on Linux, Solaris, HP/UX, iOS, WinCE, and Windows.

**Methodologies** used include Test-First development, Agile development, Extreme Programming.

**Algorithm** analysis and optimization, reducing complexity and solving complex problems economically.

**Environments** include Web, iPhone apps, database, application, enterprise, FDA class I and class II medical devices, embedded, portal, AI, games, audio-visual, soft real-time, signal analysis, and pure graphics.

**Administration** for Unix, Linux, Windows, Exchange, and legacy systems, while maintaining security, optimizing and automating the environment, and integrating the technologies involved; phone system maintenance.

**Team skills** include lead, mentorship, code review, teaching, specifications and requirements; understanding of development lifecycle, dependencies, and shipping and release cycles.

**Talents** include troubleshooting, enjoying a fast learning curve, wearing multiple hats, serving as software wizard and Unix guru, handling ambiguity, transforming complexity.

## Skills Overview

**Expert skills:** Linux, C/C++, JavaScript, sh, TCP/IP, Security Auditing & Tightening, OOP

**Strong skills:** C#, Objective C, .NET, iPhone, Python, XML, SQL, Unix

SOFTWARE DEVELOPMENT	SYSTEMS ADMINISTRATION	NETWORK ADMINISTRATION	INTERNET PROTOCOLS
Developed software using various object-oriented programming languages, compilers, Internet scripting languages, database interfaces, shell scripts, legacy languages, low-level languages and libraries, including: C, C++, C#, Objective C, VC++, gcc .NET, STL SSL, sockets Perl, Ruby, Java, JavaScript, Python HTML, XML Bash, sh MySQL, PostgreSQL, MongoDB x86 Assembly X Windows	Hardware analysis & purchasing, installation, administration, and troubleshooting System security Systems integration User administration  Apache Web Server  Operating systems administered include: Linux • RedHat • Debian Solaris • NetBSD • OSX	SMTP DHCP SAMBA / SMB DNS / DDNS SSH / SFTP NTP FTP NFS NIS	RFC-level knowledge of and experience with many Internet protocols, including: TCP/IP HTTP SMTP NTP DNS

## Education

Bachelor of Science, Mathematics, University of Washington.

## Chronological Project List

6/14 – current	Software Development Engineer, Emhart Bucher Glass (contract)
9/13 – current	Founder, Inventor, and Software Architect, SapioSpace (owner)
11/13 – 5/14	Senior Software Development Engineer, Accusoft (staff)
12/10 – 9/13	Senior Software Engineer, Mandiant (staff)
1/09 – 11/09	Sabbatical
3/09	Algorithm Development Engineer, H.I.V.E. (consultant)
4/07 – 12/08	Software Development Engineer, Microsoft (contract)
4/08 – 8/08	Software Development Engineer, Intellitax (contract during Microsoft 100-day break in service)
3/06 – 4/07	Software Development Engineer, MySQL (contract)
5/04 – 4/06	Software Development Engineer, Olympic Medical (contract)
6/02 – 4/04	Systems Administrator, PopCap Games (staff)
8/01 – 6/02	Independent Consultant (independent & contract)
3/99 – 7/01	Systems Engineer/Systems Administrator, RealNetworks (staff)
9/98 – 1/99	Software Development Engineer, Microsoft (contract)
1/98 – 7/98	Software Development Engineer, Adobe (contract)
3/97 – 12/97	Software Development Engineer/Test, Microsoft (contract)
4/95 – 5/97	Software Development Engineer/Systems Administrator, UW Environmental Tactical Systems of Applied Physics Lab (staff)

## Experience

### Software Engineer (contract)

**Bucher Emhart Glass**

*June 2014 - current*

**Integral part of team focused on creating next generation glass inspection technology.**

Technologies utilized include C#, .NET 4.5, Windows 8.1 Store Apps (Metro), WCF, Apache Thrift, C++

- Signal processing and analysis (1 and 2 dimensional) (IIR, Background Subtraction, Contour Analysis algorithms)
- Algorithm development
- Developed process control software
- Designed and developed system monitoring software
- Designed and implemented hardware interface software from limited specifications
- Designed and implemented REST data storage system

### Founder and Inventor (co-owner)

**SapioSpace, LLC**

*Sep. 2013 - current*

**Created digital filter construction algorithm and formed a small startup to patent and market the technology. It is currently patent pending.**

- Formed a startup with three other founders.
- Created proof-of-concept software from research done during 2009 sabbatical.
- Wrote documentation for patent (pending.)
- Provided technological direction and standards for company.

### Senior Software Development Engineer (staff)

**Accusoft**

*Nov. 2013 – May 2014*

**Served as software developer for middle tier REST platform to provide an unified method of document format transformation. Provided technical specifications and software based on those specifications.**

Technologies utilized include C#, Mono, Node.js, and sh scripting.

### Senior Software Development Engineer (staff)

**Mandiant**

*Dec. 2009 - Sep. 2013*

**Served as lead, mentor, and software developer. Duties included prototyping, algorithm design, maintenance, and technology evaluation.**

Projects included:

- MIR (Mandiant Intelligent Response)

- Linux server (Gentoo) using Python, PostgreSQL, and sh scripts.
- Maintenance and implementation of new features.
- Active Directory integration for user login.
- Award winning performance on project.
- MSO (Mandiant Search Optimization)
  - Lead for front end / UI team.
  - Linux server (CentOS) using JavaScript (browser and Node.js) and MongoDB.
  - Created query language to represent recursive queries for front end / middleware communication.
  - Created animated UI to represent complex data.
  - Went from prototype to released product.

## Sabbatical

*Jan. 2009 - Nov. 2009*

**Took sabbatical during economic downturn to accomplish cross-country relocation and pursue personal R&D in mathematics and digital filter technology. Now living in Saint Petersburg, FL.**

## Algorithm Development Engineer (consultant)

*H.I.V.E.*

*March 2009*

**Developed algorithms involving motion-capture technology. Reduced complexity on a 450-term equation to a six-term equation, resulting in a potential tenfold decrease in processing speed. Developing other algorithms for use in kinematics SDK.**

## Software Development Engineer (contract)

*Microsoft*

*Apr. 2007 - Dec. 2008*

### Projects included:

#### • WinCE

*Aug. 2008 - Dec. 2008*

- Main project involved porting a network interfacing app from WM6 to WM7.
- Substantially cleaned, streamlined, and boosted the understandability of the code and writing tools in C# to facilitate the process. App was in C++ with a ZAML interface. Performed depreciation work on 11-gigabyte code base.

#### • Connected Systems Architecture

*Jan. 2008 - Apr. 2008*

- Wrote infrastructure software for New Computer Languages Group. Duties included developing and extending tools for the team, developing tools to use with VSTS and Product Studio, and creating other infrastructure needed by the team.
- Turned a tool beloved of the team from a quickly-written hack of another developer into an extensible and maintainable tool with unit tests.
- Created a tool to ease porting of Product Studio databases.
- Updated product to use strong names and the GAC to prepare it for release.
- Technologies utilized included C#, .NET, Windows, msbuild, Product Studio, and VSTS.

#### • Zune

*Apr. 2007 - Dec. 2007*

- Wrote software that runs on WinCE-based personal-entertainment device to support the manufacturing process of that device. Duties included writing libraries, debugging device driver code, supporting hardware development, and factory support.
- Technologies utilized included C#, .NET, WinCE, C++, Windows, DirectDraw, and XML.
- Developed expertise in understanding WinCE at low level.
- Wrote most of the top-level validation code used in the factory for the Zune 4, Zune 8, and the Zune 80.
- Wrote reusable code when and where possible, which was leveraged for an ultimate time-savings for the team.

## Software Development Engineer (contract)

*Intellitax*

*Apr. 2008 - Aug. 2008*

**During mandatory 100-day break in service from Microsoft, wrote code for the new version of the Intellitax Online product. Duties included extending and reworking the existing website,**

## developing infrastructure tools, and updating the MS SQL schema.

Technologies utilized included C#, ASP.NET, ADO.NET, Windows Forms, Visual Studio, and NHibernate.

- Reworked the existing website (in ASP.NET) to use a substantially different schema and database layer (NHibernate).
- Created a tool to ease transition to new database layer using Windows Forms and ADO.NET; new system uses a more complex data creation model.
- Added functionality to website to ease bringing forward of returning customers.
- Created and revised software specification documents.

## Software Development Engineer (contract)

*MySQL*

Mar. 2006 - Mar. 2007

**Served as software engineer for the maintenance team on a telecommuting basis while attending school as a returning student. Responsibilities included learning the internals of the MySQL server and fixing assigned bugs inside the server.**

## Software Development Engineer (contract)

*Olympic Medical*

May 2004 - Apr. 2006

**Major duties encompassed real time programming in C++, creation of a Linux distribution, and custom hardware troubleshooting.**

Served as architect and primary back-end programmer for two of the company's flagship projects, CFM6000 and CoolCap, a medical designed to reduce brain damage in newborn infants due to birth trauma. The survival rate for infants with this kind of trauma has increased from 45% to 55% through use of this medical device. Both products used a speed-limited CPU and were required to be soft real-time systems. These systems were programmed in C++.

## Responsibilities included:

- Soft real-time programming in C++ utilizing IPC.
- Design and implementation of a failsafe device, where my portion of the design was required to handle both the normal operation and failures of software machine control, data acquisition, data processing, data retention, and export of data to allow for off-line analysis.
- Design and implementation of a data retention system that required minimal data loss in the event of a power failure and the ability to retrieve time and type slices of data.
- Logging, analysis, and reporting of machine operation and failure modes.
- Design and implementation of installation and repair software for the device.
- Design and implementation of software to upgrade data from previous version. Previous version used a proprietary binary data format which had size limitations, data corruption issues, and required much help to read and utilize. New version used XML data, was faster, had a smaller data footprint size, and was easily compressed, archived, and brought into other programs for analysis.
- Served as Linux go-to person, and mentored colleagues in Linux usage and administration.

## Accomplishments included:

- Discovery of an algorithm to analyze and solve a problem that both researchers and engineers in the entire field had thought was not solvable prior to my discovery.
- Design, implementation, and maintenance of the Linux distribution that is used on these devices.
- Design, implementation, and maintenance of a fast IPC system that could handle arbitrarily large quantities of data per packet and no waiting for the transmitter.
- Design and implementation of a library to handle many forms of data transmission and analysis.

## Systems Administrator (staff)

*PopCap Games*

June 2002 - Apr. 2004

**Major duties encompassed systems administration on Linux, and development—primarily in C++, Java, and Perl—on Linux and Windows.**

Built all systems for game company, growing from a single, overloaded, outdated web server to nine Unix machines with interrelated functions, including failover. Oversaw a bandwidth increase of 100x (1.5mb/s to 150mb/s optimized) and facilitated a peak concurrent user increase of 3x (from 8K peak to over 29K),

during which overall downtime was less than .05%.

## Responsibilities included:

- Systems administration (installation, maintenance, migration, upgrades, and teardown of Linux, XP, DNS, Apache, Exchange, and Exim).
- Systems security (Linux, XP, firewalls – auditing plus defining and encouraging appropriate practices).
- Purchasing analysis and acquisition of hardware and software.
- Programming (automation, games, and system monitoring in C, C++, Java, MySQL, PHP, and Perl).
- Some installation, upgrades, and maintenance of Cisco systems (1700, 3600, 7600, PIX).
- Phone system maintenance.
- Automation and workflow optimization.
- Interviewing and assessing job candidates.

## Accomplishments included:

- Automating detection, notification of, and response to service failure.
- Creating a low-bandwidth, reliable, extensible protocol for system monitoring. Created using Java for the central server, and display applets. Perl was used for the reporting/monitoring scripts.
- Vastly improving system security via audits, insecure service removal, and defining and enforcing secure practices.
- Creating automated Web site pushout system utilizing CVS, Perl and PHP and allowing for versioned Web sites with seamless switchover
- Implementing automatic server installation process, reducing work involved from a full day to approximately 10 minutes for basic install.

## Consultant (Independent and Contract)

Aug. 2001 - June 2002

**Served as consultant for individuals and companies on both independent and contracted projects.**

### Tasks included:

- **Systems administration**
  - Performed installation, maintenance, and upgrades of Linux, DNS, Apache, and Exim.
- **Security**
  - Auditing
  - Procedure definitions
- **Development**
  - C, C++, Java, PHP, and MySQL
- **Web Development / Administration**
  - Created a new Web authorization/ authentication system using Apache, mod\_perl and MySQL. New system implemented all security features of old and realized an up to 500-fold increase in Web site response
  - Created Web site backends utilizing a combination of MySQL, Python and Zope.
  - Set up parallel Web server and database testing environments to prevent disruption to mission-critical production environment
  - Repaired custom software system (a combination of Perl, ASP, C/C++ and MSSQL), enabling it to work at a new ISP, and set up new billing software system for same

## Software Development Engineer/Systems Administrator (Staff) *RealNetworks* Mar. 1999 - July 2001

**Served as Unix system and network administrator for 80-person in-house consulting team and as developer on the development team. Served as mentor and instructor. Designed and taught classes on using Unix and Unix systems administration. Interviewed and evaluated job candidates.**

## Accomplishments included:

- Ported/maintained a ColdFusion/HTML/Oracle Media Portal administration system to Solaris.

- Created automatic installation packages for Solaris that eliminated customer installation difficulties.
- Vastly improved lookup logic in several products for media portal, reducing lookup time from tenths of a second to instantaneous (e.g. from  $O(n)$  to  $O(1)$ ).
- Designed and created a secure, encrypted, atomic, and automated file transfer program utilizing TCP and UDP, using Oracle to describe files to be transferred and network topology.
- Created a run-time configurable logging facility that: utilized minimal resources when not in use, included prioritized messages, included multiple separately configurable destinations, and was configurable via multiple prioritized sources.
- Developed other front- and back-end software for numerous Internet-media portal projects in various languages and several databases under Solaris and Linux. Languages used include Bash, C++, Perl, Python, HTML, and ColdFusion. Databases used include MySQL and Oracle.
- Developed a Web-based DNS administration system utilizing Zope and MySQL, reducing average turnaround for DNS and IP requests from one day to under one minute.
- Teaching Systems Administration

**Software Development Engineer (Contract)** *Microsoft* Sep. 1998 - Jan. 1999

**Windows Media Player**

Wrote internationalization code for Windows Media Player using VC++.

**Software Development Engineer (Contract)** *Adobe* Jan. 1998 - July 1998

Prepared an object-oriented (VC++) desktop publishing product for localization, developed internationalization tools using Perl and VC++, and served as troubleshooter for team.

**Software Development Engineer In Test (Contract)** *Microsoft* Mar. 1997 - Dec. 1997

Created a test platform to verify the hardware design of a graphics chip, using VC++ and MFC.

**Programmer / Systems Admin** *APL / Univ. of Washington* Apr. 1995 - May 1997

**Environmental Tactical Systems of Applied Physics Lab, Environmental Parameters Data Bank (EPDB)**

- Co-designed and prototyped EPDB, a real-time, interactive, object-oriented, X Windows data-driven mapping program in C++ (gcc).
- Designed user-configurable GUI in Motif/X Windows.
- Designed interfaces in EPDB for various data sources.
- Administered various UNIX workstations for team: HPUX, SunOS, and IRIX.

**Selected Personal Projects**

- Development of speech recognition research tools (ongoing).
- Development of commercial tools for analyzing DSP filters.
- Research in optimization and cryptography.
- Development of hybridized genetic programs and neural networks for modeling emergent intelligence.
- Development of evolutionary kinematics and inverse kinematics algorithms.