

# Curriculum Vitae

**Dr. Gareth Loy, DMA  
Stanford, 1980**

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## Synopsis

### Litigation Support

- 20 years experience
- Testified before the ITC
- Testified before a jury in Federal Court
- 6 IPRs
- 2 Markman claim construction hearings
- 1 Markman tutorial
- Deposed 12 times
- 30 cases, 24 as Expert of Record
- > 51 reports and declarations
- Patent, copyright, trademark infringement, inequitable conduct, trade secrets
- Software/source code discovery (C/C++, Java, ObjectiveC, Lisp, yacc, lex, etc.)

### Primary Technologies

- > 40 years experience
- **Generalist:** computer science/ senior software engineer/software architect in academia and industry
- **Specialist:** digital media, networked media systems, digital signal processing (DSP) especially for music and audio

### Published Author and Lecturer

- 41 peer-reviewed publications in major journals, internationally
- Frequent lecturer; keynote speaker at MCM2015, London
- *Musimathics*, two-volume reference on digital audio signal processing and music published by MIT Press

### Academic / Degrees

- Doctorate (DMA) from Stanford (1980)
- Stanford Artificial Intelligence Laboratory (SAIL)
- Stanford Center for Computer Research in Music and Acoustics (CCRMA)
- Lecturer/Researcher UCSD (taught graduate courses in computer science and digital signal processing at UCSD for a decade)

### Employment

- Apple Computer (1979, worked for Jef Raskin who reported to Steve Jobs)
- Frox, Inc.
- Sonic Solutions/Rovi
- ATI/Chromatic Research
- Sony Corporation of America

## Dr. Gareth Loy – Curriculum Vitae

### Consulting Clients

Buchla Assoc., Philips Semiconductor, Equator Technologies, Raza Microelectronics, Pixim, Inc., Cradle Technologies, Siemens Microsystems, Infineon Technologies, Zoran Corp., Dolby Laboratories, Malleable Technologies, C-Cube Microsystems, TriMedia Technologies, BOPS, Inc., SeaSound LLP, Palm, Inc.

### Source Code Discovery

- E-Watch v. Apple — digital watch functions
- Black Hills Media v. Samsung — networked mobile media players
- MobileMedia Ideas v. Apple — media codec, music recording, playlist, image compression and resolution conversion, GPS automobile navigation
- RMail v. Amazon — email authentication and dispatch
- Mirror Worlds v. Apple — OSX system, Spotlight, CoverFlow, Finder, and Time Machine, IOS system, iPod, iPhone, Apple TV, and xServe system and applications
- ValueClick v. Tacoda — behavioral profiling for advertising
- 1st Technology v. Tiltware — black-box forensic analysis of Internet gambling application
- Visto v. Good — file synchronization across server, desktop, cellular network, and mobile handheld devices
- Visto v. RIM — file synchronization across server, desktop, cellular network, and mobile handheld devices
- Premiere International v. Apple — iTunes, iTunes Music Store (ITMS), stem to stern source code analysis
- Digeo v. Audible — audio content, encryption, audio downloading from the Internet, and device integration for handheld players
- Information Technology Innovation v. Motorola — Fortran 77 software program dating from 1986 for factory automation
- Audio MPEG v. Creative Labs — reviewed CL's MPEG decoder source code for noninfringement

### Expertise

- Digital Signal Processing (DSP), audio codecs, music technology, acoustics, digital recorders
- Home entertainment systems, set-top boxes
- Large Scale Software Architecture/Analysis in C, C++, Objective-C, Java, Swift, etc.
- Networked digital media, streaming digital media, digital radio
- Mobile apps, cellular networks, iOS iPhone apps, iPad apps, Android apps, PDAs, data synchronization
- Enterprise email apps, Enterprise networked systems
- Factory automation software
- Networked file systems, file backup/restore and archiving
- Media databases, iTunes Music Store
- MPEG, MP3 and MPEG Standards
- On-line gaming
- Internet commerce systems
- Networked digital cameras, CCDs, digital video, DVDs, video codecs
- GPS navigation systems
- Music Technology
- Operating systems
- User interfaces
- Compilers/assemblers
- Real-time computing, parallel processing systems
- Digital watch systems

# Dr. Gareth Loy – Curriculum Vitae

## Professional Summary

Dr. Loy has over 40 years of academic and engineering experience and 20 years experience as an expert witness in computer science, software development, network streaming media, embedded systems, enterprise software systems, digital signal processing for audio and music technology.

He has sustained a long and successful career at the cutting edge of software development and system design using multiprocessor/multi-core architectures for signal processing and control. He has been Software Architect for multiple projects at various companies, and has consulted for a long list of technology companies. Through Gareth, Inc., Dr. Loy provides computer technology consulting, software engineering, and litigation support to high-technology companies, internationally.

Dr. Loy has testified before the International Trade Commission, and before a jury in Federal Court, has testified at Markman claim construction hearings and Markman tutorials in Federal Court, been deposed over 10 times, and has authored more than 50 reports and declarations. Case types include patent, trademark infringement, copyright, trade secret misappropriation, and inequitable conduct. He has worked on complex international patent cases, and has provided expertise on such diverse areas as streaming media systems, handheld networked Personal Information Management (PIM) devices, enterprise email systems, software for factory automation, interactive databases, enterprise software for management of media libraries, MPEG audio compression, on-line gaming, composition systems, digital camera hardware and software, digital audio hardware and software technologies, compilers, file systems, operating systems, and more. (See the Summary of Testifying Experience below.)

Dr. Loy's doctorate is from Stanford, 1980, where he studied under Dr. John Chowning at the Stanford Artificial Intelligence Laboratory and the Center for Computer Research in Music and Acoustics.

He has published widely in various juried journals, and has authored three books with the MIT Press, including *Musimathes*, a two-volume text on the mathematics of music, and *Music and Connectionism*, a collection of articles on artificial neural networks and music research.

He taught graduate and undergraduate courses in computer science and digital audio at UCSD for a decade, cofounded the Computer Audio Research Laboratory there, conducted computer systems research for digital audio, designed and built several networked digital media computer laboratories.

## Education

<u>Year</u>	<u>College or University</u>	<u>Degree</u>
1980	Stanford University	DMA digital signal processing (DSP), computer science (CS), computer systems for audio, real-time computing, and compiler technology. Thesis research: <ul style="list-style-type: none"><li>• Stanford Artificial Intelligence Laboratory (SAIL)</li><li>• Center for Computer Research in Music and Acoustics (CCRMA)</li></ul> I wrote the compiler for the Systems Concepts Digital Synthesizer, and conducted foundational research in digital audio that led to hardware and software systems to compute digital audio in real time.
1975	San Francisco State University	B.A. Music — music technology, computer science, composition, and classical guitar

### Projects and Skills

- > 40 years experience as a C/C++/ObjectiveC/Java software engineer, software systems architect
- Early Apple employee (1979), worked for Jef Raskin, who reported directly to Steve Jobs
- Lecturer and researcher in computer science, digital signal processing for a decade at UCSD
- Architected numerous large-scale enterprise software and hardware systems
- Developed and debugged prototype multiprocessor systems, real-time systems, embedded systems, file systems
- Wrote assemblers, compilers, linkers/loaders
- Created hundreds of user-level applications on numerous platforms
- Built home entertainment systems, professional audio recording systems
- Designed, developed and implemented embedded systems for handheld applications
- Direction and management of research and software development projects
- Digital audio signal processing, systems software for custom computing platforms
- Parallel-processing systems software
- Operating systems: PC, UNIX, OSX Mac, iOS iPhone, Windows Developer Studio, LINUX, VxWorks, and WindRiver
- Computer programming language development with yacc and lex
- Real-time programming with VxWorks
- Systems programming, device drivers, file systems, systems administration
- Multiprocessor systems programming
- Multimedia computing
- Designed, debugged, and documented microprocessor Instruction Set Architecture for Philips
- Built automatic document generation systems that created finished documents directly from commented code source
- Designed software, hardware, and VLSI architectures

### Professional Experience

From: 1998  
To: Present  
Organization: Gareth, Inc., Corte Madera (Marin County), CA.  
Title: President  
Summary: Provide software and hardware engineering, and litigation support to high-technology companies, internationally.

From: 2003  
To: 2004  
Organization: Sony Corporation of America  
Title: Software Architect, Super Audio CD Project  
Summary:

- Developed 48-track pro-audio recording system for authoring next-generation audio media, including SACD/DSD audio discs, DVD, and Blu-Ray discs.
- System included synchronous Internet transmission of digital audio, custom hardware interfacing, complex user interface design, real-time operating systems (VxWorks), code development in C++, interfacing to traditional recording devices.
- Improved system design to meet project goals
- Met aggressive project deadlines.

## Dr. Gareth Loy – Curriculum Vitae

- Manager: Ethan Grossman (currently at Digidesign)

From: 1994

To: 1998

Organization: Chromatic Research, Inc.

Summary: Senior Information Engineer

- 1997-1998:
- Wrote hardware architecture documentation for next-generation multi-media processor
  - Wrote software API reference documentation for multi-media processor

Senior Digital Audio Engineer

1994-1997:

- Reverse-engineered popular FM synthesis chip, and reduced it to software simulation running on Mpsact processor
- Reviewed extensive music synthesis patent law, advised on patent protection strategies and work-arounds to patented signal-processing technologies.
- Led wave-table synthesis project, hired & managed voicers, licensed sound libraries, specified the synthesis architecture, interfaced between marketing, engineering and voicers
- Represented Chromatic at the MMA's IASIG 3DWG (3D audio industry group of the MIDI Manufacturer's Association)
- Spearheaded the successful effort to open Microsoft's 3D audio API to hardware acceleration
- Consulted on 3D audio subsystem design

From: 1994

To: 1994

Organization: Sonic Solutions; Novato, CA

Title: Senior Digital Audio Engineer

Summary: Specified, architected, and implemented track-based recording system for automatic dialog replacement (ADR) and Foley, involving user interface design, new core functionality for rapidly capturing and easily comparing multiple session takes.

From: 1988

To: 1993

Organization: Frox, Inc., Milpitas, CA

Title: Digital Audio Systems Architect and Project Lead

- Summary:
- Member of VLSI design team that developed a custom stream-oriented move engine that linked an array of up to 16 Motorola 56000's, operating synchronously at the instruction and sample level. Features included subsampling, 24x24 AES-EBU serial link I/O, and both asynchronous parameter update and synchronous data movement to/from a host computer
  - Debugged brass-board and ASIC implementation of move-engine with architects.
  - Designed and implemented the user interface, system model, and control system for a parallel-processing multiple-DSP audio subsystem
  - Developed user interface for audio system based on proprietary Frox "wand" remote controller.
  - Implemented Lucasfilm THX processing, Dolby ProLogic, concert hall simulation and other forms of audio processing
  - Wrote marketing documentation, white papers, delivered papers at conferences (AES and ICMA), and wrote support documentation
  - The FroxSystem received the Industrial Design Excellence Award (IDEA)

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